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REVIEW ARTICLES

(1) " **The Present Position of Phenothiazine as an Anthelmintic** ".

(2) " **Trichomoniasis—A Review of Recent Literature** ".

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DISEASES CAUSED BY BACTERIA AND FUNGI

McDOWALL, F. H., JAMES, J. P., & WARD, A. H. (1941). **Studies on the Detection of Mastitis in New Zealand Dairy Herds. III. An Investigation into the Application of the Bromthymol Blue Test for Mastitis in the Field.**—*N.Z. J. Sci. Tech.* **23.** 223A–236A. [For previous parts, see *V. B.* **12.** 479; for part IV, see below.] **2110**

In a large-scale field trial of the bromthymol-blue test for the detection of mastitis, there was marked lack of uniformity in the reading of the test by different workers. Some of the lack of uniformity in the results was due to the personal error. While complete elimination of personal error in such a comparison could never be achieved, a greater uniformity should be obtainable by selection of the personnel by use of colour blindness tests, through the provision of more complete training and supervision, and possibly through an improvement in the colour gauge.

The general result of the investigation is in line with that of many other workers in that positive bromthymol-blue test readings are of more reliable significance than the negative readings. The test appeared to pick out only about 40–50% of the samples with high leucocyte assessments, but about 80% of the samples showing a positive bromthymol-blue test had a high leucocyte assessment. The estimations of pH by the quinhydrone method confirm that this represents approximately the maximum possible reliability of the test.—M. B. BUDDLE.

JAMES, J. P., & McDOWALL, F. H. (1941). **Studies on the Detection of Mastitis in New Zealand Dairy Herds. IV. An Examination of the Hopkirk Assessment and of the Breed Cell Count Method of Estimating the Leucocyte Content of Milk Samples.**—*N.Z. J. Sci. Tech.* **23.** 237A–243A. [Authors' summary copied *verbatim*]. [See also preceding abst.] **2111**

The Hopkirk assessment method of estimating leucocyte content of milk by examination of a smear of gravity cream from the sample was found to give reasonably concordant results, with the same worker examining creams in duplicate, and with different workers in the same laboratory. The divergence was much greater when the estimations were made by workers in different laboratories. The different Hopkirk classifications were assessed in terms of Breed cell count. There was a considerable amount of overlapping of the classes, but with a Breed cell count of 1,000,000 per millilitre taken (arbitrarily) as the boundary line between negative and positive mastitis infection, the Hopkirk classes 0 to 2 give a reasonably uniform indication of the negative cases, and the classes 4 to 6 give similarly a reasonably uniform indication of positive cases.

It has been shown that even in examinations of the same Breed smear there are quite wide variations in duplicate results of one observer, or in the results of different observers, with the Breed cell count.

BURGESS, R. (1943). **Report on an Investigation of Streptococcal Mastitis.**—*Proc. Soc. agric. Bact., 1943.* p. 69. **2112**

A brief note on work carried out in an area over a period of 3½ years.—H. I. FIELD.

STIRLING, A. C., & WATTS, P. S. (1943). **Notes on the Bacteriological Diagnosis of Contagious Mastitis.**—*Proc. Soc. agric. Bact., 1943.* pp. 67–68. **2113**

This is a comparative study of various aspects of the bacteriological diagnosis of bovine contagious mastitis. It is stated that peptone can be omitted from Edward's medium without affecting the growth of *Streptococcus agalactiae*. Composite samples were as efficient as quarter samples in detecting infected cows, but the streaking of Edward's plates from incubated samples detected more infected cows than deep plating from unincubated samples. A greater number of samples were positive at 48 than at 24 hours. A comparison was made of the Hotis test, direct deep plating, and surface plating after incubation for 48 hours. Of 572 samples, 57 were positive by direct deep plating and 83 by streaking after 48 hours' incubation. With the Hotis test, of 115 positive at 20 hours, 65 yielded *Str. agalactiae*, while of 238 positive at 48 hours, *Str. agalactiae* was isolated from 83. It is pointed out that it is necessary to plate all apparent Hotis positives, as the test is not sufficient in itself. A further table shows the different results obtained with the Hotis test after washing the udders by the usual farm method as against the use of sterilized cloths. The results indicate how erroneous the Hotis test can be if insufficient care is given to this procedure. Other comparisons made were between Edward's broth, modifications thereof, and direct plating. The last gave the best results in this experiment. Details of media used are given in an appendix.—H. I. FIELD.

McNELLIS, R. (1943). **An Unusual Type of Anthrax in Horses and Mules.**—*Bull. U.S. Army med. Dep.* No. 71. pp. 84–86. **2114**

Two horses and two mules dying of acute anthrax presented no enlargement of the spleen on P.M. examination. [Since it is well known that spleen enlargement occurs in anthrax in horses less commonly than in infected cattle, the use of the word "unusual" in the title seems unjustified.]—R. M. LOOSMORE.

CORPER, H. J., & COHN, M. L. (1943). **The Virulence of Tubercle Bacilli and the Fallacy of Assuming the Grade of Virulence from Arbitrary Designations.**—*Amer. J. clin. Path.* **13.** 352–361. **2115**

The authors have studied the virulence of ten cultures of H 37, a human strain of tubercle bacilli isolated from sputum by Baldwin in 1905. This strain has been extensively used in America for the preparation of tuberculin, for experimental infection as a standard virulent strain, and for chemical and immunological studies. The ten cultures were obtained from different laboratories in the U.S.A. and had been grown on a wide variety of media. Dissociation of the organism into R and S variants was described in 1934 and two of the cultures used in the present study were the dissociated variants. Virulence was examined by intravenous and subcutaneous inoculation into g. pigs by two separate groups of workers. Variations from complete avirulence (no organ TB. three months after intravenous or subcutaneous inoculation of 1 mg.), to extreme virulence (death within 17 days after intravenous inoculation of 1 mg.) were obtained.

The virulence of recently isolated strains of human type tubercle bacilli showed only a slight diminution over a period of six years of cultivation on egg media. A human strain isolated in 1920 was still virulent for g. pigs 23 years later, although the virulence was considerably reduced. A bovine strain cultivated over the same period was still highly virulent for g. pigs and rabbits.

Injection of 1 mg. of culture into the marginal ear vein of the g. pig is recommended as a useful rapid method for determining virulence, but for accurate work it is necessary to use graded subcutaneous inoculations.—E. G. WHITE.

LARSEN, C. (1943). 13. Aarsberetning samt Fortegnelse over tuberkulosefri Besaetninger i Ribe Amt. **[Thirteenth Annual Report of Work on TB.-Free Cattle Herds in Ribe Amt, Denmark].**—*Maanedsskr. Dyrlaeger.* **55.** 80. [Only abst. given.] **2116**

During the period ending in July 1942, progress was made in increasing the number of TB.-free herds, 60% being clean and a further 7·7% being in process of disinfection. The number of TB.-free herds was 6,287, containing 100,223 cattle.

Of the 74 dairying districts, seven were entirely clean and in 17 more, 70% of all the herds were clean; in 43 districts, 40–70% of the herds were clean, leaving only seven districts with over 70% of the herds infected.

Some fresh regulations concerning tuberculin testing and adjustments in the price of milk are referred to but not specified. In general, the whole campaign is regarded as having been very successful.—J. E.

HILLERMARK, K. (1942). Bidrag till kännedom om spontan human tuberkulos hos nötkreatur. **[Spontaneous Human Type TB. in Cattle].**—*Skand. VetTidskr.* **32.** 442–451. [English summary]. **2117**

H. traces the history of early experiments on the susceptibility of cattle to human type tubercle bacilli, concluding with the work of PLUM who demonstrated lesions in a calf and also isolated human type bacilli from the bovine tonsil and mesenteric lymph nodes.

The problem in Sweden to-day is most important since herds with bovine type infection are subject to different control from those exhibiting avian type, human type, or nonspecific sensitization. Bovine type can be distinguished from avian type infection by the simultaneous use of the respective tuberculins. Such a method cannot be used to distinguish human type infection, the presence of which may, however, be suspected when the intradermal injection of bovine and avian tuberculins evokes nearly equal responses. In such herds, the Finnish method of differential diagnosis is adopted. This comprises a series of tests, a double dose of mammalian tuberculin being used. Cattle which have reacted to the intradermal test, and are free from bovine type infection but have human type infection, do not react regularly to these tests—so-called "skipping"—and the reactions tend to become less and less marked. As a check on this method, laboratory determination of the type of infection is important.

H. isolated human type bacilli from four cattle; in four instances from lung tissue or lymph nodes and once from the mesenteric lymph nodes. The technique is described. No macroscopic lesions were found. It was discovered that these animals had been in contact with human beings suffering from phthisis. The clinical histories of some herds are also given, of which the following is typical. In a Scandinavian herd of 150 cattle regarded as free from TB., 11 animals reacted to the intradermal test. The reactions were small, as were those at the subsequent comparative bovine-avian types test. They were such that avian type infection could not be incriminated. The subcutaneous temperature test revealed the characteristic "skipping" and transient nature of the reactions. Organisms of the human type were isolated from two reactors.

—G. B. BROOK.

MALLICK, S. M., AGGARWAL, H., & DUA, R. L. (1942). **An Investigation into the Incidence and Type of Tuberculous Infection in Cattle at Amritsar with Special Reference to Human Infections.**—*Indian med. Gaz.* **77.** 668–672. **2118**

The authors, after referring to the paucity of recorded cases of bovine type infection in human beings in India, describe their own work in which they examined 62 strains of tubercle bacilli isolated from extrapulmonary lesions in human beings in various parts of the Punjab, none of which strains proved to be of the bovine type. They then carried out the double intradermal tuberculin test on 1,234 cattle in Amritsar city and, although 282 or 23% of the animals proved to be infected, in none of the 101 cases in which the milk was examined microscopically, culturally, and by g. pig inoculation were tubercle bacilli isolated. The authors suggest that, possibly, Indian cattle possess unusual resistance, and also that their open-air existence may account for these results, and the fact that infection of the mammary gland rarely occurs. The usual practice of boiling milk before consumption acts as an additional safeguard against infection.—L. SAHAI.

LAPORTE, R. (1943). Un mode particulier d'autolyse microbienne. La désintégration progressive des bacilles du genre *Mycobacterium.* **[Bacterial Autolysis. Progressive Disintegration of Mycobacteria].**—*Ann. Inst. Pasteur.* **69.** 262–267. **2119**

The characters of autolysis of mycobacteria observed in the disintegration of cultures are as follows. (1) It is a slow process lasting several months. The autolysed culture becomes almost completely converted into cyanophilic substance, amorphous or granular. (2) The intensity of the lytic process varies with the strain and the cultural conditions. (3) Autolysis of the bacilli results in liberation into the surrounding medium of soluble constituents, such as proteins and polysaccharides, and insoluble, non-acid-fast granules. (4) These constituents are liberated in a physico-chemical state resembling that which they possess in the intact bacilli. (5) The liberated products are all more or less active, having allergenic, antigenic, and sensitizing powers.

These facts, if they obtained in the animal body, would explain, at least in part, the slowly progressive action of tubercle bacilli on the tissues.

—I. W. BROCKLEHURST.

BEAN, C. W., MILLER, W. T., & HEISHMAN, J. O. (1943). **A Note on Corynebacterium Pyogenes as the Cause of Bovine Mastitis.**—*J. Amer. vet. med. Ass.* **103.** 200–202. 2120

Mastitis due to *Corynebact. pyogenes* is described in 15 cows, affecting 23 quarters. The cases occurred in seven dairy herds, a high proportion being in milch cows. No definite seasonal incidence was observed. Clinical observations are described.—B. WEITZ.

COTCHIN, E. (1943). ***Corynebacterium equi* in the Submaxillary Lymph Nodes of Swine.**—*J. comp. Path.* **53.** 298–309. 2121

Lesions in the lymph nodes of 86 bacon pigs had the appearance of those of TB., and C. isolated *Corynebact. equi* from those of eight pigs. Attempts to recover the organism from apparently normal submaxillary lymph nodes from 50 pigs were successful in one instance. C. considers that this last finding, together with the negative results of experimental infection he obtained, supports the view that *Corynebact. equi* has probably no primary role in the causation of TB.-like lesions in the pig. The literature on *Corynebact. equi* is discussed.—M. L. LEVI.

PETERMAN, J. E. (1944). **Swine Erysipelas.**—*Vet. Med.* **39.** 53–58. 2122

A general discussion of the disease with special emphasis on the differential diagnosis and methods of control.—M. L. LEVI.

*ZAHARIJA, I. (1942). [**Hyperimmunization of Horses with *Erysipelothrix rhusiopathiae***].—*Vet. Arhiv.* **12.** 17-41. [Abst. from abst. in *Wien. tierärztl. Mschr.* **29.** 381]. 2123

The author investigated the changes brought about in 57 horses used in the production of swine erysipelas antiserum. The horses were given altogether an average of 26,298 ml. of broth culture of *E. rhusiopathiae*, and yielded an average of 282 kg. of blood, which was taken monthly in 17 kg. amounts.

The author states that *E. rhusiopathiae* is pathogenic and even fatal to horses. He describes three stages in the disease, of which the third is clinically detectable. After death, following bleeding or other causes, degenerations in the internal organs, chronic endocarditis and hepatitis were noted.—A. R. JENNINGS.

THJÖTTA, T. (1943). **Erysipelothrix rhusiopathiae Causing a Fatal Meningal Infection in a Human Being.**—*Acta path. microbiol. scand.* **20.** 597–606. [In English]. 2124

A fatal case of *E. rhusiopathiae* infection is recorded in a veterinary surgeon aged 53 years. Following prolonged symptoms of rheumatism, an acute illness with headache, loss of appetite, and slight fever occurred. A tentative diagnosis of brain tumour was made. Death occurred 24 hours after surgical operations which revealed an abscess in the right temporal region between the dura mater and the arachnoidea. *E. rhusiopathiae* was isolated from the abscess. In this case it was present in long threads twisted together in clumps. The point is stressed that this organism should not be expected to occur always as the straight or slightly curved delicate rod described in text-books.—D. D. O.

CECCALDI, J., GUILHAUMOU, F., & MALBRANT, R. (1942). La pasteurellose du lapin à Brazzaville. Isolement de l'agent causal, son étude, essai de vaccination. [**Rabbit Pasteurellosis in Brazzaville**]. —*Rev. Sci. méd. pharm. vét. Brazzaville.* **1.** No. 2. 63–72. 2125

A report on outbreaks of *Pasteurella septica* infections in rabbits. The use of heat-killed vaccines (60°C. for one hour) was not successful in controlling the disease.—M. L. LEVI.

HINSHAW, W. R., & EMLEN, J. T. (1943). **Pasteurellosis in California Valley Quail.**—*Cornell Vet.* **33.** 351–354. 2126

California quail, after a journey in crates previously used for game birds, contracted pasteurellosis, although another group of birds transported in similar containers did not. There were no *ante-mortem* symptoms; P.M. lesions and bacteriology are described. The condition was verified by infecting a rabbit, and was reproduced in healthy quail. The danger of wild fowl entering farm yards and transmitting fowl cholera to stock is referred to.—J. M. PETERS.

STEINHAUS, E. A., PARKER, R. R., & MCKEE, M. T. (1944). **Cultivation of *Pasteurella tularensis* in a Liquid Medium.**—*Publ. Hlth Rep., Wash.* **59.** 78–79. 2127

Up to 1943, it was thought impossible to grow *Past. tularensis* in liquid medium; then TAMURA & GIBBY [*V. B.* **14.** 49.] succeeded in so doing. The present authors have evolved a medium which they have used successfully for a year. The formula is:– (a) bacto-heart infusion broth 32 g., glucose 10 g., cystine 1·5 g.; (b) bacto-haemoglobin 5 g. Details of preparation are given.

Strains of *Past. tularensis* from water, ticks, muskrats and human beings were inoculated into this medium. A turbid growth appeared usually within 48 hours and not later than after 3–4 days. Serial cultivation of the organism was found possible, with no change of morphology or degree of virulence for g. pigs.—R. M. L.

CHRISTENSEN, W. B., & GOWEN, G. H. (1944). **An Arabinose-Fermenting Bacterium of the Lactose-negative, Mannitol-negative Shigella Group.**—*J. Bact.* **47.** 171–176. 2128

Fifteen strains of a slow arabinose-fermenting, lactose-negative, mannitol-negative bacterium of the *Shigella* group were isolated from cases of dysentery in human beings. The organism failed to agglutinate in *Bact. shigae* antiserum, and it is thought that some strains of *Bact. shigae* previously reported as non-agglutinable are identical with this organism, for which the authors now propose the name *Shigella arabinotarda*, n.sp. Many strains have been considered inagglutinable owing to failure on the part of investigators to utilize smooth phases of the organism in agglutination studies; in the course of this work, it was found necessary to take great care in picking only characteristic smooth colonies in order to obtain suspensions which would agglutinate to titre. Antigenically, two types of the organism were distinguished, with practically no cross-aggln. between them, and there was little or no cross-aggln. with other strains of *Shigella*. Most of the strains belonged to the type designated A, and all these fermented arabinose within 2–5 days; strains designated type B required 7–25 days. Transfers from arabinose tubes which had finally become acid caused rapid fermentation in fresh arabinose medium, indicating that the late fermentation was not due to slow utilization of the sugar, but to the production of a variant.—T. M. DOCKER.

RUGE, H., & TUDOR, V. (1943). Gasbildende aerobe Sporenträger mit agglutinatorischen Eigenschaften für die Typhus-Ruhrgruppe sowie für Bang und Proteus X19. [**Gas-Forming Aerobic Spore-Bearing Bacteria with Agglutinin Relationships with the Typhoid-Dysentery Group and also for the Brucella-Proteus X19 Group**].—*Zbl. Bakt. I.* (*Orig.*). **150.** 191–199. 2129

Two strains of gas-producing, spore-bearing aerobic organisms are described in detail. They were isolated respectively from a healthy woman and from a man with dysentery. They were possibly members

of the *Bacillus sphaericus* group, but showed some cultural differences, and were pathogenic for mice and rabbits. They showed strong agglutination with different immune sera of the typhoid-dysentery group of organisms, and immune sera prepared against them, besides agglutinating strains of that group, also agglutinated *Br. abortus* and *Proteus* X19.—E. Cotchin.

I. —. (1942). **Twenty-second Annual Report of Pullorum Disease Eradication in Massachusetts by the Poultry Disease Control Laboratory.**—*Control Bull. Mass. agric. Exp. Sta.* No. 112. pp. 11. **2130**

II. —. (1943). **Twenty-third Annual Report of Pullorum Disease Eradication in Massachusetts by the Poultry Disease Control Laboratory.**—*Ibid.* No. 116. pp. 11. **2131**

I. Fourteen preventive measures are detailed. In the 1941–42 season, 667,824 samples were tested and of these 662,715 were from chickens. There were 1,757 (0·27%) reactors. No reactors were detected among tested birds in five of 13 counties. The figures show a marked increase (99,153) over the previous season of birds in non-reacting flocks.

II. The report for the season 1942–43, although not as satisfactory (a slight decrease in the number of flocks and birds tested and an increase to 0·48 in the percentage of positive tests) still shows encouraging results, especially when considered in connexion with the conditions which confronted flock owners during the year. As in the previous report, a table is given showing the results of testing for over 20 consecutive years. In 1920–21, the percentage of reactors was 12·5, and in 1942–43, it was 0·48, although in this time the number of birds tested increased approximately 25 times.—John G. Campbell.

de Azevedo, A. G. (1942). Pulorose. [**Pullorum Disease**].—*Bol. Minist. Agric., Rio de J.* **32.** No. 1. 59-65. **2132**

A general descriptive article on pullorum disease. —I. W. Brocklehurst.

Jørgensen, H. (1943). Brucella abortus-Infektioner hos Katten. [*Br. abortus* **Infection in Cats**].—*Maanedsskr. Dyrlaeger.* **55.** 116–123. **2133**

Blood tests for brucella infection on 47 ownerless cats of Copenhagen and on six cats from farms having infected cattle gave uniformly negative results.

Seven cats were artificially infected with *Br. abortus*, being kept under clinical observation and blood-tested at intervals before being killed and examined. Three cats infected perorally gave no sign, subjective or objective, of infection. Two cats infected subcutaneously showed no sign of infection, either *ante-* or *post-mortem*, except by the production of agglutinating and complement-fixing antibodies. One cat infected by conjunctival instillation reacted negatively to all tests, and one cat infected intravenously was clinically sick for one day and produced agglutinating but not c.-f. antibodies, but showed no P.M. sign of infection. In no case was it possible to isolate the organism at the time of autopsy.

In view of these results, J. considers that cats do not play a part in the spread of brucellosis.—J. E.

Williamson, A. R. H. (1944). **Abortion in Brucella Abortus Fever.**—*Brit. med. J.* June 3rd. 752. **2134**

Report on infection with *Br. abortus* in a woman who had aborted. The patient had a febrile illness and her blood serum yielded positive agglutination reactions. Unfortunately, no steps were taken to ascertain the cause of the abortion.

Norell, N. O., & Olson, Å. (1943). Om värdet av serologiska mjölkundersökningar medelst "ABR" (Abortus Bang Ringprobe). [**Value of the Ring Test in Examination of Milk for Brucella Infection**].—*Skand. VetTidskr.* **33.** 321–341. [In Swedish: English summary]. **2135**

The ABR ring test (rapid tube test using milk and stained antigen) was used in hundreds of herds, and in 225 of them comparatively with the slow blood agglutination test. The ring test was found to be specific and did not fail to reveal infection in a single case detected by the slow method. In eight cases the ring test was positive when the blood test was negative, but this discrepancy was hardly significant as the two tests were not carried out simultaneously.

It is concluded that the ring test is reliable enough to be adopted in the State control scheme as an orientating test—as a grouped sample test suitable for routine use two or three times a year. Its use would save much trouble by reducing the number of blood aggln. tests, if it were used as a criterion in eliminating uninfected herds from further testing.

The technique of the test is given in detail, as well as much incidental comparative information.—J. E.

Wise, B., & Kerby, G. P. (1943). **Cultivation of Brucella from the Blood.**—*J. Bact.* **46.** 333–336. **2136**

Citrated blood was incubated with bacto-tryptose broth in several tubes, at 37°C. After 6–7 days, some material was removed from the blood-broth interface with a pipette, and inoculated on to a blood-agar slope. The supernatant broth was discarded, and the remaining blood inoculated into molten bacto-tryptose agar, and plates poured. Growth usually occurred after 48 hours. The supernatant broth was discarded because, in preliminary experiments, it never proved positive in the absence of a positive result from one or other of the other two materials. The results were variable, the blood residue proving a better material than the blood-broth interface. It is emphasized that both materials must be subcultured as growth may occur in one in the absence of growth from the other. The only advantage of this method over the old ones is that it takes less time.—R. M. Loosmore.

Evans, F. R., & Curran, H. R. (1943). **The Accelerating Effect of Sublethal Heat on Spore Germination in Mesophilic Aerobic Bacteria.**—*J. Bact.* **46.** 513–523. **2137**

The germination time of spores of nine different organisms was held to be the time taken for the culture to lose the thermostable characteristics of spores and to assume the thermolabile characteristics of vegetative organisms. This differs from the methods of other workers who measure the time taken for visible plate colonies to appear from spore-cultures, and who have reached the conclusion that the application of sublethal heat retards the germination of spores. Using their time standard, the present authors conclude that pre-heating to 65°–95°C. (optimum 85°C. for 8–10 min.) accelerates spore germination, depending on the two following factors. (1) The nature of the medium in which pre-heating occurs. Spore germination was accelerated in seven out of nine cultures heated and incubated in glucose broth, in five out of eight cultures heated in distilled water and incubated in glucose broth, and in all of nine cultures heated and incubated in evaporated milk. (2) The reaction of the medium. The optimum pH for acceleration differs with the species of organism under test.

It is suggested that the heat acts by increasing respiratory activity of the spores, reducing the time

required for the attainment of a constant velocity of oxidation.

The altered capacity for germination was still manifest after one week in distilled water, following pre-heating.

Given the right conditions in the medium, it is concluded that three hours of incubation following pre-heating is equivalent to 24 hours or more without pre-heating.—R. M. Loosmore.

See also absts. **2254**, **2290**, **2291**, **2324** (mastitis), **2167**, **2326** (staphylococci), **2169** (anthrax), **2182**, **2329**, **2330** (TB.), **2246** (pneumococcus), **2142** (listeria), **2163** (*Past. aviseptica*), **2163**, **2168** (salmonella). **2244** (necrotic enteritis in pigs), **2159** (*S. pullorum* phage), **2234**, **2312**, **2313** (vitamin E and brucellosis), **2165** (*Cl. welchii*), **2164** (tetanus toxoid), **2328** (bacterial cultivation).

DISEASES CAUSED BY PROTOZOAN PARASITES

Hall, R. P. (1943). **Growth-Factors for Protozoa.** —*Vitamins and Hormones.* **1.** 249–268. New York: Academic Press Inc. **2138**

This review represents a critical survey of the scanty available information regarding protozoan growth-factors, a field in which specific investigations have covered a period of approximately ten years. For the purpose of this article, H. restricts the term "essential growth-factor" to substances which must be present in a medium to ensure growth of a given species, the term "non-essential factor" being used for substances which need not be present in a suitable medium even though such substances may stimulate growth when added to the medium, *i.e.*, these latter factors either are not required in metabolism or are synthesized sufficiently rapidly to meet basic requirements. The 14 sections of the text are headed as follows :– Introduction, The Basal Medium, Thiamin, Riboflavin, Pyridoxine, Pantothenic Acid, Other Vitamins of the B-Complex, Ascorbic Acid, Sterols, Hematin and Related Substances, Unidentified Growth-factors, Factors including Excystment, Miscellaneous Growth Stimulants, and Discussion. Seventy-five references are given.

Information of direct interest to veterinarians includes the discussion of general principles and procedures for the investigation of vitamin requirements, and notes on the ascorbic acid, haematin, cholesterol, and unidentified factor requirements of various species of *Leishmania*, *Leptomonas*, *Trypanosoma*, and *Trichomonas* (in relation to this last it is suggested that the high requirements of ascorbic acid which have been postulated may indicate that the acid is functioning, not as a growth-factor, but as a reducing agent exerting a nonspecific effect on the redox potential of the medium). The article concludes with a critical survey of the difficulties and pitfalls of investigational methods and suggestions are made as to certain criteria which, if adhered to, would prevent avoidable technical errors. —J. Lochiel McGirr.

*Zesewitz, H. (1942). Die Verbreitung der Nagana und ihrer Überträger in Afrika. [**The Distribution of Bovine Trypanosomiasis and its Vectors in Africa**]. —*Inaug. Diss., Hanover.* [Abst. from abst. in *Zbl. Bakt. I.* (*Ref.*). **114.** 199]. **2139**

A review of the distribution of "fly disease" and tsetse flies. It is pointed out that, outside Africa, tsetse flies occur in Southern Arabia [information based on a few old references ?—Ed.], and that in the absence of tsetse flies, trypanosomiasis occurs in cattle in America, where it is thought to have been introduced by importation of animals from Africa. In Africa the severity of the disease is said to decrease from east to west, and from central Africa toward the north and south.—U. F. R.

Hudson, J. R. (1944). **Acute and Subacute Trypanosomiasis in Cattle caused by *T. vivax*.**—*J. comp. Path.* **54.** 108–119. **2140**

Acute cases of trypanosomiasis, similar to *T. simiae* infections in pigs, have been encountered in cattle, the phenomenon being ascribed to *T. vivax*, though some of the cases occurred in animals with mixed *T. vivax* and *T. congolense* infections.

After an incubation period in these cattle of 4–20 days, the onset of disease was sudden with a rise in temperature to 104°F. or over. After a period of high fever, possibly a week, the animal went down and was unable to rise; death was preceded by coma. Parasites swarmed in the blood towards the end of the temperature reaction, but often disappeared just before death.

Subserous and submucous haemorrhages occurred, particularly in the abomasum and duodenum, and a few cases are described with free haemorrhage into the lumen of the caecum. Other lesions included enlargement of the liver and spleen, haemorrhages throughout the kidneys and on the mucosal surface of the bladder, and black areas, resembling anaerobic lesions, in the abdominal and shoulder muscles. Death could occur before the development of anaemia.

Records of blood changes in six animals are given, but owing to the existence of complicating infections with anaplasms and piroplasms, no definite conclusions can be drawn from them. A comparison with the findings in *T. simiae* infection of pigs is given, and the findings in chronic and subacute *T. vivax* infections are discussed, subacute cases being defined as those in which the course is rapid, but in which death is associated with severe anaemia rather than with a low blood sugar value.—U. F. Richardson.

*Gonzalez, R. J. (1942). Nota sobre quimio-immunidad y sobre paso trasplacentario del tripanosoma equiperdum. [**Chemo-Immunity and Placental Transmission of** *Trypanosoma equiperdum*].—*Rev. Sanid. Hig. publ., Madr.* **16.** 542–548. [Abst. from abst. in *Zbl. Bakt. I.* (*Ref.*). **144.** 199]. **2141**

T. equiperdum proved unable to migrate through the placenta of mice even when a highly virulent strain was used. Death of mice treated with large doses of salvarsan is ascribed to liberation of toxin by the destroyed trypanosomes. Treatment of infected mice with small repeated doses of neosalvarsan resulted in recovery, and two months after recovery the animals showed a distinct resistance to reinfection. Young of untreated infected mothers showed some immunity to trypanosomes up to two months after birth.—U. F. R.

*Tobia, A. (1942). La resistenza al infezione da Castellani equiperda in animali con monocitosi sperimentali da B. monocytogenes. [**Resistance to *Trypanosoma equiperdum* Infection in Animals with an Experimentally Produced Monocytosis due to** *Listeria monocytogenes*].—*Arch. ital. Sci. med. colon.* **23.** 219–239. [Abst. from abst. in *Zbl. Bakt. I.* (*Ref.*). **144.** 199]. **2142**

In g. pigs which after inoculation with *L. monocytogenes* showed no reaction, and in rabbits which after one inoculation showed only a slight monocytosis, no difference could be detected in the reaction of inoculated and control animals to *T. equiperdum* infection. In rabbits inoculated twice with *L. monocytogenes*, resulting in an appreciable monocytic reaction, the survival period was, however, increased to 20–27 days, as against 13–16 days in controls.—U. F. Richardson.

MORGAN, B. B. (1943). **Studies on the Immobilization-Reaction of Trichomonas Foetus (Protozoa) in Cattle.**—*J. Immunol.* **47.** 453–460. **2143**

M. studied the immobilization reaction of *T. foetus* in sera from cattle experimentally and naturally infected. Five heifers were given repeated intramuscular injections of washed bacteria-free trichomonads; two heifers received formalin-killed trichomonads intramuscularly; two heifers were injected intravenously with living trichomonads. The sera of all these animals immobilized *T. foetus* 16–22 days after the first infection in dilutions of 1 : 4 to 1 : 128. Reinjection 102 days after the last injection, when the titres were at zero or very low, produced titres as high or higher than the previous maximum figures. The maximum immobilization titre was reached in an average of 55 days after the first injection, agglutinins persisted for about 177 days, and complete immobilization lasted for 40 days.

In field tests no reaction was observed in sera from 400 trichomonad-free cattle and 52 trichomonad-free bulls, nor in sera from 11 naturally infected bulls and from 10 cows with natural vaginal infections. Of 12 cows which had aborted only two reacted to the test. In only two of 29 cows with trichomonad pyometra was there immobilization at a 1 : 1 dilution and this was only partial. M. concludes that the test as used is of little practical value in the diagnosis of trichomoniasis.
—M. L. BINGHAM.

HERMAN, C. M., JANKIEWICZ, H. A., & SAARNI, R. W. (1942). **Coccidiosis in California Quail.**—*Condor.* **44.** 168–171. [Abst. from abst. in *Biol. Abstr.* Sect. F. **16.** No. 10. 36]. **2144**

The presence of coccidiosis in California quail at the San Joaquin Experimental Range, California, was revealed by an examination of the droppings of 121 birds over a period of four months from April to August, infection being noted in 89 birds. A decrease in infection was noted from April to August, suggesting a possibility of seasonal variation. A higher percentage of infection seemed to occur in female birds.

VERSIANI, V., & GOMES, B. F. (1943). "Plasmodium juxtanucleare," parasita da galinha domestica (notas adicionais). **[Further Note on *P. juxtanucleare* in the Domestic Fowl].**—*Rev. brasil. Biol.* **3.** 113–117. [English summary]. **2145**

The authors describe the symptoms in experimental infection of fowls by *P. juxtanucleare*. For some time, sometimes for months, after infection, no symptoms are shown and few parasites are found in the blood. Eventually there is progressive emaciation with pronounced anaemia, and sometimes diarrhoea is a feature of the disease. P.M. the birds are found to have a considerable amount of fluid in the pericardial sac and most of the internal organs are heavily pigmented.—MILLER WATSON.

WOLFSON, F. (1943). **Further Studies of the "3T" Strain of *Plasmodium cathemerium* in White Pekin Ducks.**—*Amer. J. Hyg.* **37.** 325–335. **2146**

The "3T" strain of *P. cathemerium* which W. isolated from a woodthrush in 1937 has now been inoculated from a canary into ducks and, by means of intravenous inoculation, has been carried through a total of more than 115 birds in a period of five months. Periodicity in segmentation and the degree of parasitaemia and anaemia in the duck are here considered. The asexual cycle in ducks is completed in about 24 hours and the peak segmentation occurs between 8 p.m. and midnight. Each schizont produces on the average 13 merozoites. On the third day after inoculation peaks are reached simultaneously in the number of parasites per 10,000 red blood cells, the percentage of parasitized red cells, and the number of parasites per cu.mm. blood. The peak and severity of infection are increased and the peak of parasitaemia is postponed after a rapid passage of the "3T" strain through the duck. Anaemia associated with the infection is most pronounced 2–3 days after the peak of parasitaemia.
—C. HORTON SMITH.

MANWELL, R. E., & EDGETT, R. (1943). **The Relative Importance of Certain Factors in the Low-Temperature Preservation of Malaria Parasites.**—*Amer. J. trop. Med.* **23.** 551–557. **2147**

M. has already shown the low-temperature preservation of malaria plasmodia to be a useful technique. In the present paper results are reported of studies of some of the doubtful factors such as the relative advantages of using thinner tubes, manual as compared with mechanical rotation in the freezing and thawing process, freezing and storage temperatures, the effect of time of storage on viability, and the effect of a high proportion of parasitized cells on the proportion of parasites remaining viable after freezing and thawing. *P. lophurae* was used in most of the experimental work and White Pekin ducks less than one month old were used as hosts. It was found that thin glass tubes are superior to thicker ones, and by their use toxoplasms, which could not be preserved when thick tubes were used, were satisfactorily preserved. It appears that temperature of storage is much more important than the temperatures at which freezing is done. Plasmodia retained their viability when frozen at temperatures up to 10°C. The refrigerated container must remain at a reasonably low temperature. Plasmodia succumb within 24 hours if exposed in the ice chamber of an ordinary electric refrigerator set at a temperature of about −10°C. Frozen malaria plasmodia will remain viable and without signs of deterioration for as long as 244 days and probably longer if stored in a CO_2 ice cabinet (−75° to −50°C.). It was found that mechanical rotation was more effective and consistent than manual rotation during the freezing and thawing process.—C. H. S.

COGGESHALL, L. T. (1943). **Immunity in Malaria.**—*Medicine.* **22.** 87–102. **2148**

C. describes certain aspects of malarial immunity as shown by recent work conducted on man and animals. Investigations which resulted in the demonstration of some of the circulating antibodies acquired during the development of immunity receive particular attention. It appears that protective substances in immune serum sensitize the parasite and thus expose it to more effective phagocytosis. The defences of the host depend upon combined cellular and humoral mechanisms. The evidence points to the immunity as being an infection immunity.—C. HORTON SMITH.

ROSSI, A. L. B., & IRIARTE, D. R. (1942). Estudios sobre epizootia aviaria (espiroquetosis gallinacea). **[Studies on Avian Spirochaetosis].**—*Bol. Lab. Clin. "Luis Razetti".* **3.** 121–127. **2149**

An account of *Spirochaeta gallinarum* infection in fowls in Venezuela. Spirochaetes could not be detected in the coxal fluid of engorged ticks collected in the hen house, nor did suspensions of these ticks set up infection when injected into a number of chicks.

*KATHE, J. (1943). Infektionen mit Leptospira grippotyphosa bei Tieren und ihre Bedeutung für die Epidemiologie des Schlamm-Feldfiebers. **[The Role of Animals in the Epidemiology of *Leptospira grippotyphosa* Infection ("Swamp Fever")].**—*Z. Immun-Forsch.* **103.** 60–77. [Abst. from abst. in *Zbl. Bakt. I. (Ref.).* **144.** 182]. **2150**

In addition to its being proven that the fieldmouse

is a reservoir host of *L. grippo-typhosa*, it has been shown that horses, cattle, and dogs can be infected. How great a bearing these facts have on the epidemiology of human "swamp fever" is still uncertain. Years when mice are very numerous are usually associated with widespread outbreaks of "swamp fever", but in 1933 there was a plague of mice without prevalence of "swamp fever". In years of flood there may be epidemics of "swamp fever" without plagues of mice. It is considered that in any case standing water and moist conditions play an important role in epidemiology of the disease.—U. F. RICHARDSON.

See also absts. **2175**, **2292** (trypanosomiasis), **2293** (malaria), **2308** (bovine piroplasmosis), **2331** (tissue culture).

DISEASES CAUSED BY VIRUSES AND RICKETTSIA

AVELANGE, R. (1943). Epizootie de fièvre aphteuse d'origine porcine. **[Foot and Mouth Disease Spread by Pigs].**—*Rec. Méd. vét.* **119.** 17–21. **2151**

An outbreak is described of F. & M. disease occurring in the province of Haute-Marne in the spring and summer of 1939. In all, 854 cows, 14 sheep, and 98 pigs were affected. The outbreak was traceable to the sale to a number of farmers within the province, of 29 piglets sent to a pig dealer from the province of Nord. F. & M. disease was confirmed on the premises in Nord, from which the piglets originated, three days after their departure. Initially in the outlook a serum was used from recovered cases from another outbreak which had terminated four months earlier in the same province, but this proved ineffective. (This serum later proved quite effective in a recrudescent outbreak in the northern part of the province.) The outbreak was virulent, affected animals being very ill and many dying within a few hours despite treatment. From this it was deduced that the virus was of a different strain from that responsible for the previous outbreak in the province. The National Research Laboratory reported that they had identified only virus O during 1939, but owing to wartime difficulties they were unable to type the virus in this outbreak. Convalescent serum from the later outbreak was protective.—H. I. FIELD.

LÉPINE, P., & GIUNTINI, J. (1943). A propos du virus de la fièvre aphteuse. Détermination sans observation directe du diamètre particulaire et de la constante de sédimentation. **[Method for the Determination of the Size and the Sedimentation Constant of the Virus of Foot and Mouth Disease].**—*Ann. Inst. Pasteur.* **69.** 257–261. **2152**

Ultracentrifugation experiments showed that the F. & M. disease virus of Vallée type O strain has an average particle size of about 14–19 mμ and a sedimentation constant of $S_{20} = 33 \cdot 1^{-13}$.—I. W. BROCKLEHURST.

*GEURDEN, L. (1941). **[Susceptibility of Magpies to Pigeon-Pox Virus].**—*Vlaam. Diergeneesk. Tijdschr.* **10.** [Abst. from abst. in *Wien. tierärztl. Mschr.* **29.** 318]. **2153**

Pigeon-pox virus rubbed into the skin of magpies gives rise to typical pox lesions. The incidence of pigeon pox in magpies is not known, but G. considers that from the viewpoint of control of an epizootic of this disease, the possibility should be considered of wild birds being natural reservoirs of the virus.—A. R. J.

MILLER, G. L., & STANLEY, W. M. (1944). **Quantitative Aspects of the Red Blood Cell Agglutination Test for Influenza Virus.**—*J. exp. Med.* **79.** 185–195. **2154**

The authors have made a careful study of the variations which may arise in the chicken red cell agglutination (CCA activity) technique of HIRST. The standard red cell suspension was prepared from adult birds; the virus was a purified PR8 strain suspended in 0·1M phosphate buffer at pH7, while the extent of agglutination was estimated by matching to a standard with a Klett-Summerson photo-electric colorimeter. All tests were carried out in replicate measurements (5).

A standard error of 2·9% was observed, an indication that where duplicate analyses are made on different samples, the chances are 19 out of 20 that differences of 8·4% in the mean end-points are significant. Changes in pH of the medium had very little effect on the reaction, but the most reproduceable results were obtained at a temperature of 24°C. Variations in the concentration of red cells over a fairly wide range had no significant tendency to alter the end-points, but differences were encountered in the specific behaviour of red cells from different chickens [see also STUART-HARRIS—*V. B.* **13.** 424].—R. E. GLOVER.

SHWARTZMAN, G. (1943). **Association of the Virus of Lymphocytic Choriomeningitis with Erythrocytes of Infected Animals.**—*J. Bact.* **46.** 482–483. **2155**

In mice and g. pigs infected with lymphocytic choriomeningitis, the virus is firmly associated with the red blood corpuscles. Infectivity of the r.b.c. varies and is more consistently observed in a species when the strain of virus is highly virulent for that species. —M. L. LEVI.

BAKER, J. A. (1944). **A Virus Causing Pneumonia in Cats and Producing Elementary Bodies.**—*J. exp. Med.* **79.** 159–172. **2156**

Material from a highly infectious respiratory tract disease in cats, characterized by greyish consolidation in the antetior lobes of the lungs, was inoculated intranasally into mice and set up a transmissible virus pneumonia with increase in virulence after passage. The virus failed to infect by the intracutaneous, intraperitoneal, or subcutaneous routes. A mild febrile reaction with moderate pneumonic lesions was produced in cats, rabbits, and adult g. pigs: a more severe disease occurred in hamsters and young g. pigs. The agent was readily transmitted to the chorio-allantoic membrane and to the yolk sac of developing eggs in which numerous e.b. were detected.

The experimental disease in cats was similar to that seen in naturally infected animals. In contact experiments, illness developed in 6–10 days with conjunctivitis and muco-purulent discharge from the eyes. Prolonged sneezing occurred followed by a chronic cough. Virus was recovered from ocular and nasal secretions, and from the lungs. Recovered cats were resistant to reinfection. No clear-cut evidence of serum-neutralizing antibodies was forthcoming, but complement-fixing antibodies were readily detected. The disease differs from feline panleucopenia described by LAWRENCE & SYVERTON [*V. B.* **11.** 366.] and the pneumotropic virus recently isolated by BLAKE *et al.* [*V. B.* **13.** 428].—R. E. GLOVER.

BUGHER, J. C., BOSHELL-MANRIQUE, J., ROCA-GARCÍA, M., & OSORNO-MESA, E. (1944). **Epidemiology of Jungle Yellow Fever in Eastern Colombia.**—*Amer. J. Hyg.* **39.** 16–51. **2157**

A lengthy description is given of investigations into yellow fever in eastern Colombia. The virus of the disease was demonstrated 13 times in the mosquito, *Haemagogus capricornii* and once in *Aëdes leucocelaenus*. *H. capricornii* is arboreal, and may persist over a dry season, thus providing a means of carrying virus over from one rainy season to another. Though jungle yellow fever may occur in monkeys and marsupials

without the development of clinical symptoms, the virus only persists for a few days, and the true reservoir is believed to be the mosquito. Although the mortality in clinically recognizable human cases is high, protection tests indicate that about 90% of human infections do not develop clinical symptoms.—U. F. RICHARDSON.

PHILIP, C. B. (1943). **Nomenclature of the Pathogenic Rickettsiae.**—*Amer. J. Hyg.* **37.** 301–309. **2158**

Attention is called to the need for following standard taxonomic practice as closely as possible to reduce the tangle in the nomenclature of rickettsia. It is pointed out that whilst some authors believe that the genus should be limited to arthropod-borne pathogens, some include organisms living more or less symbiotically in insects, and others have placed species in the genus although they do not appear to have even an implied arthropod relationship.

The nomenclature of human pathogenic rickettsia is discussed, and it is concluded that taxonomic stability will have to await further biological clarification of the interrelationships of the various rickettsia. The following check list is given.

Genus—*Rickettsia*

Sub-genus *Rickettsia*.—Typhus group.

Sub-genus *Dermacentroxenus*.—Rocky Mountain spotted fever group.

Sub-genus *Coxiella*.—" Q " fever group.

—U. F. RICHARDSON.

BAYLOR, M. R. B., SEVERENS, J. H., & CLARK, G. L. (1944). **Electron Microscope Studies of the Bacteriophage of Salmonella Pullorum.**—*J. Bact.* **47.** 277–285. **2159**

Under the conditions of the experiment, phage adsorption is well advanced even after 3 min. The phage particles, clearly shown, are 40–45 mμ in diameter and have no tails visible at any magnification employed. Photographs have been obtained showing the progressive disintegration of the cells under the influence of phage. Large masses about 150 mμ in size, attached at fairly regular intervals on the intact cell, appear in the 6–9 min. preparations ; they may indicate an agglomeration of the small particles and they gradually disappear as if being redispersed or digested.—J. M. ROBSON.

SCHADE, A. L., & CAROLINE, L. (1943). **The Preparation of a Polyvalent Dysentery Bacteriophage in a Dry and Stable Form. I. Preliminary Investigations and General Procedures.**—*J. Bact.* **46.** 463–473. **2160**

The medium used and the method of preparation of this bacteriophage from six strains of dysentery bacteria are described. Phage mixtures were made in two ways, by mechanical mixing of batches of the chosen phages and by inoculating final phage growth medium with the susceptible bacterial strains and seeding with their respective phage races. Titres of preparations were assessed in serial dilutions of broth. Concentration *in vacuo* of the polyvalent bacteriophage prepared by either of these methods produced no loss in titre. Final lyophilization of the concentrate, except in one case, gave a stable and fully active product. It is suggested that the method might be used for phage production from other organisms such as staphylococci and *Vibrio cholerae*.—J. M. PETERS.

See also abst. **2294** (smallpox).

IMMUNITY

MOSHKOVSKIĬ, S. D. (1941). Immunitet i allergiya. [**Immunity and Allergy**].—*Med. Parazitol., Moscow.* **10.** 307–323. **2161**

M. reviews various papers presented at the conference of microbiologists and pathologists held in Moscow on January 29th and March 20th, 1941. [The report on this conference has not yet been received.]—A. MOLDAWSKY.

PARK, R. G. (1944). **Sulphonamide Allergy.**—*Brit. med. J.* June 10th. 781–782. **2162**

The specificity of the sensitivity in 40 cases allergic to sulphonamides has been investigated. In 60% the allergy was confined to one sulphonamide drug. In 40% it occurred to several sulphonamides and to sulphanilic acid. In about half of the latter, allergy was due to the sulphonamide radical $NH_2.C_6H_4.SO_2$–. In the other half it was due to the amino-phenyl radical $NH_2.C_6H_4$–, reactions also occurring to procaine.

—J. M. ROBSON.

LANFRANCHI, F. (1942). Su l'aumento della soglia di resistenza, verso le infezioni da *septicus* e da paratifo, in animali trattati col *subtilis* e col polisaccaride di questo. [**Increase in Resistance toward Pasteurella and Paratyphoid Infection in Animals Treated with *Bacillus subtilis* and its Polysaccharide**].—*Boll. Soc. ital. Biol. sper.* **17.** 167–169. **2163**

Inoculation of mice with material from several strains of *B. subtilis*, or with material from a single strain, or with polysaccharide extracted from one strain, raised the resistance of the animals to lethal doses of *Past. aviseptica* and *Salmonella typhi-murium*. The polysaccharide extract gave the greatest amount of protection.—I. W. BROCKLEHURST.

MUELLER, J. H., SCHOENBACH, E. B., JEZUKAWICZ, J. J., & MILLER, P. A. (1943). **Production of Tetanus Toxin on Peptone-Free Media.**—*J. clin. Invest.* **22.** 315–318. **2164**

Acute anaphylactic shock following injections of tetanus toxoid has, in a few cases, been shown to be due to the presence of peptone. For this reason, a strain of *Clostridium tetani* has been induced to grow on peptone-free medium. This paper describes the composition of the medium, emphasizing the necessity for a low iron concentration, and showing that the yield of toxin, as estimated in mice, is of the same degree of potency or higher than that obtained from the same strain of organism grown on peptone-infusion broth.

—J. M. PETERS.

SEAL, S. C. (1942). **A Note on the Production of *Clostridium perfringens* (Type A) Toxin in a Modified Liver and Veal Digest Medium.**—*Indian J. med. Res.* **30.** 229–243. **2165**

The following medium was employed for the production of *Cl. welchii* (Type A) toxin :– fat-free veal, 1,870 g. ; beef liver (fresh), 450 g. ; water, 9,000 ml. ; HCl (concentrated), 75 ml. ; pepsin (1 : 10,000) (Difco), 0·25 g.

The effect was studied of (1) glucose concentration, (2) dried meat and $CaCO_3$, and (3) sodium thioglycollate on this medium, as well as the influence of varying incubation periods on the production of potent toxin. The author's results indicated that there were possibly two antigens to constitute a more complete *Cl. welchii* Type A toxin. Antigen I corresponded with β-toxin of Prigge and contained lethal, haemolytic, opacity, and possibly, necrotic factors. Antigen II corresponded with the α-toxin of Prigge and to haemolysin A of Shnayerson and Samuel and was predominantly a haemolytic factor. As a result of these experiments, S. was able to prepare highly potent toxin at a com-

paratively low cost. He also found that lethal haemolytic and opacity factors contained in the toxin indicated a more complete *Cl. welchii* toxin which was composed of two antigens characterized by different haemotoxin.

Previous work on the subject is reviewed.—B. S.

CANNON, P. R. (1942). **Antibody Production and the Anamnestic Reaction.**—*J. Lab. clin. Med.* **28.** 127–139. **2166**

This article reviews existing information regarding the conditions which determine the production of globulin in relation to the nature of the antibody mechanism. Current concepts of antibody-producing processes, all of which agree in postulating intracellular production from globulin, are discussed and recent progress in the search for the origin of the serum proteins is surveyed. The relationship to the antibody-producing mechanism of such widely distributed cell systems as macrophages, fibroblasts, and endothelial and epidermal cells, all of which possess, in varying degrees, the potentiality of synthesizing globulin, is reviewed. It is concluded that wherever globulin is formed, antigenic "templates" may, if present at the sites of synthesis, so influence the structure and configuration of the globulin molecules as to confer specific properties upon them. Evidence is adduced that, under certain circumstances, antibody molecules may remain and persist within the cells in which they are formed, and reference is made to the relationship between this thesis and the concept of local tissue immunity. It is also suggested that the persistence of this intracellular antibody matrix for months or years may explain both the acquisition of acquired resistance independently of any considerable amount of antibody in the blood and also many of the tissue reactivities which are commonly regarded as allergic.

The general conclusion reached is that, since the effectiveness of globulin synthesis and consequently of antibody production is determined by the quality and quantity of the globulin reserves available, which are in turn dependent on the food amino-acid intake, dietary regime plays a very important part both in relation to effective antibody globulin production and to the potential reserve capacity of the antibody mechanism.—J. LOCHIEL McGIRR.

WEAVER, J. B., TYLER, M. W., & SCHUERMAN, D. K. (1943). **The Production of Staphylococcus Antitoxin.**—*J. Lab. clin. Med.* **28.** 1775–1785. **2167**

In an effort to find out which tissue or tissues are responsible for the production of staphylococcus antitoxin, the authors blocked various components of the reticulo-endothelial system of rabbits by benzene, indian ink, or the performance of splenectomy, and then compared the antitoxic response of these animals and of controls to the injection of toxoid. Furthermore, various organs of immunized animals were tested for antitoxin (antihaemolysin) content. Definite conclusions could not be drawn, but some evidence was obtained that staphylococcus antitoxin is produced in the bone marrow.—M. L. LEVI.

TUI, C., HOPE, D., SCHRIFT, M. H., & POWERS, J. (1944). **Purified Pyrogen from Eberthella Typhosa. A Preliminary Report on Its Preparation and Its Chemical and Biologic Characteristics.**—*J. Lab. clin. Med.* **29.** 58–62. **2168**

The authors describe a method by which they isolated a pyrogen from *Salmonella typhi*. Its chemical properties suggest that it is carbohydrate and not protein in nature. The minimum pyrogenic dose for rabbits and dogs has been determined; in the former, the range between the minimum pyrogenic and the minimum lethal dose is high, but was much lower in a quoted human case where a nearly fatal dose of antigenic material, isolated from the typhoid bacillus by other workers, was administered.—J. M. PETERS.

STAUB, A. M., & GRABAR, P. (1943). Etude quantitative de la précipitation de sérums anticharbonneux et normaux par différentes solutions de gélose. **[Quantitative Study of the Precipitation of Normal and Anti-Anthrax Sera by Different Solutions of Agar].**—*Ann. Inst. Pasteur.* **69.** 268–274. **2169**

Faulty interpretation of precipitation tests may result from the fact that anti-agar precipitins develop in an immune serum when suspensions of organisms grown on agar are used in the preparation of the serum. Anti-agar immune bodies may be eliminated by precipitation with an autoclaved formol-free solution of agar; this process, however, entails the loss of part of the specific polysaccharide antibodies of an anti-anthrax serum.

Some normal horse and dog sera precipitate heavily with agar solution.—I. W. BROCKLEHURST.

See also absts. **2143** (immobilization reaction of *Trichomonas foetus*), **2154** (influenza aggln. test), **2141** (experimental dourine immunization), **2142** (monocytosis and dourine immunity), **2148** (malarial immunity), **2234** (brucella immunity), **2184** (tumour immunity).

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

MACFARLANE, W. V. (1941). **Blowfly Strike in Marlborough, New Zealand.**—*N.Z. J. Sci. Tech.* **23.** 205A–213A. [Author's summary copied *verbatim*]. **2170**

Field observations on a season's fly strike led to the conclusions that:—(1) Breech strike tended to be confined to lambs and hoggets, with urine staining from irregular vulvae as the main form of attraction to flies in halfbreds, and crutch wrinkles in female Merinos. Breech strike was largely independent of weather.

(2) Body strike was more prevalent in finewool sheep and occurred during and after periods of heavy warm rain which followed on relatively dry periods. Strike ceased when the mean temperature fell below 50°F.

(3) Over 90 per cent. of the larvae found on sheep belonged to the species *Calliphora laemica*.

TROFIMOV, G. K. (1941). K faune sinantropnykh mukh Azerbaĭdzhana. **[Flies of Azerbaijan].**—*Med. Parazitol., Moscow.* **10.** 561–562. **2171**

Lucilia caesar and *L. sericata* are widespread. *Musca sorbens*, which is common in North Africa and Persia, was met with in southern parts of the republic.—A. MOLDAWSKY.

VLADIMIROVA, M. S. (1942). Glubina zakuklivaniya Phormia groenlandica Zett i Calliphora erythrocephala Mg. **[The Depth of Pupation of *Phormia groenlandica* (= *P. terrae-novae*) and *Calliphora erythrocephala*].**—*Med. Parazitol., Moscow.* **10.** 543–548. **2172**

Various experiments have shown that the depth of pupation of both species depends on the density of the substrate. In a dense substrate the maximal pupation depth of *P. terrae-novae* was 4 cm., and of *C. erythrocephala* 6 cm. When there was a layer of porous material above the dense substrate, the larvae passed through the porous layer and pupated 1·5–2 cm. deep in the underlying dense substrate. When bones, dry meat, or other hard substances were encountered on the porous layer, a number of *Phormia* larvae adhered to these and did not descend lower. In refuse bins,

Phormia larvae almost always pupate in the middle of the refuse and in this respect differ from *M. domestica*, the larvae of which always creep on the surface.
—A. MOLDAWSKY.

VLADIMIROVA, M. S. (1942). Sezonnoe raspredelenie i chislo generatsiĭ u myasnykh mukh. [**The Seasonal Distribution and the Number of Generations of Blow-Flies**].—*Med. Parazitol., Moscow.* **10.** 548–560. **2173**

Observations were made in Moscow during 1937–38 in a specially constructed insectarium, on the following species of blow-flies : *Phormia groenlandica* (= *P. terrae-novae*), *Calliphora erythrocephala*, *C. uralensis*, *C. vomitoria*, *Lucilia illustris*, *L. caesar*, and *L. sericata*. Of these *P. terrae-novae* was most commonly met with and *C. vomitoria* more rare. The optimal average daily temperature for migration of *C. erythrocephala* was 14°C., and of *P. terrae-novae* was 31°C.

The maximal development of *P. terrae-novae* was in July, of *L. illustris* and *L. caesar* in August, of *C. uralensis* in September, and of *C. erythrocephala* in October. The number of generations a year for *P. terrae-novae* was two, and for *C. uralensis*, *L. illustris*, and *L. caesar*, three.—A. MOLDAWSKY.

DERBENEVA-UKHOVA, V. P. (1941). K ekologii Musca domestica L. i Muscina stabulans Flln. [**Ecology of *Musca domestica* and *Muscina stabulans***].—*Med. Parazitol., Moscow.* **10.** 534–543. **2174**

Observations were made in northern parts of the Archangel province from June 26th to November 1st, 1940. Owing to lack of accumulations of horse or pig manure, development of *Musca domestica* occurred chiefly in manure and litter in calf sheds. Cow or sheep manure was not favoured by flies. In faeces of human beings the ova were deposited but the larvae were destroyed by other larvae, mainly those of *Hydrotaea dentipes*. *Muscina stabulans* hatches in the open in isolated droppings.

Imagines of *M. domestica* were mainly found in dwellings and calf sheds ; the imago of *M. stabulans* was only occasionally met in dwellings. During colder weather the flies migrated from the animal houses to the heated dwellings.

Experiments on marked flies showed that generally they frequent houses in the vicinity (within 150 metres) of their place of hatching.—A. MOLDAWSKY.

WILLIAMS, W. L. (1943). **On the Activity of the Tsetse, Glossina Pallidipes and other Tsetse during a 24 Hour Period.**—*Rhod. agric. J.* **40.** 368–370. **2175**

By using a donkey as a fly bait on a 24 hours' patrol, during a hot dry windy day followed by a moonless night in late October, it was found that the activity of *G. pallidipes* was greatest between 5 a.m. and 8 a.m. in the morning and 5 p.m. and 7 p.m. in the evening. No *G. pallidipes* were taken on the donkey between 9 a.m. and 4 p.m. or between 9 p.m. and 5 a.m.

G. brevipalpis was observed a great deal in the early morning and again at sundown, but only two were seen on the donkey. Approximately 99% of specimens of this fly encountered were males.—U. F. RICHARDSON.

WEATHERSBEE, A. A. (1944). **Observations on the Relative Attractiveness of Man and Horse for Anopheles albimanus Weideman.**—*Amer. J. trop. Med.* **24.** 25–28. **2176**

Observations on *A. albimanus* show that this species exhibits a preference for horses over man in its selection of a blood meal. Different horses offer a more uniform attractiveness for the mosquitoes, whilst the variations between different human beings are considerable. For this reason, the horse is considered to be more satisfactory than man as bait in determining the density of the species within an area.—C. HORTON SMITH.

*RILEY, W. A. (1941). **Notes on Minnesota Ticks.**—*Proc. Minn. Acad. Sci.* **9.** 57–61. [Abst. from abst. in *Biol. Abstr.* Sect. F. **17.** No. 1. 36]. **2177**

R. reports the common occurrence in Minnesota of the American dog tick, *Dermacentor variabilis*, and the "winter tick", *D. albipictus*. The latter species infests deer, moose, elk, horses, and cattle in the northern part of the state, but there is no evidence that it carries a specific disease of moose, as is sometimes stated. The brown dog tick, *Rhipicephalus sanguineus*, introduced from the southern states, has recently become established in kennels, canine hospitals, and domestic premises, in many parts of the state ; it does not winter out of doors. The rabbit tick, *Haemaphysalis leporis-palustris*, is widely distributed and attacks game birds and turkeys as well as rabbits. *Ixodes hexagonus* var. *cookei* has been taken from the dog in Minnesota.

See also absts. **2295**, **2296** (sheep ked), **2297** (ticks), **2298**, **2299** (mange).

PARASITES IN RELATION TO DISEASE [HELMINTHS]

ROVEDA, R. J. (1943). Helmintos de nuestros *Gallus gallus* Linné. [**Helminthiases of Domestic Fowls in the Argentine**].—*Rev. Fac. Agron. B. Aires.* **10.** 290–293. [English and Portuguese summaries]. **2178**

R. examined 200 fowls from the market in Buenos Aires and found that 88% had helminth infestations. Only 25% were infested by a single species, the remainder having mixed infestations. Species found included :—*Heterakis gallinae* (80%), *Ascaridia galli* (31%), *Capillaria annulata* (28%), *Choanotaenia infundibulum* (24%), *Hymenolepis carioca* (7%), *Capillaria columbae* (5·5%), *Tetrameres confusa* (3·5%), *Raillietina tetragona* (2%), *Capillaria gallina* (0·5%), and *Davainea proglottina* (0·5%).—MILLER WATSON.

HERMANSSON, K. A. (1943). Några erfarenheter vid mikroskopisk undersökning av rävkött på trikiner. [**Experiences in the Microscopic Examination of Fox Flesh for Trichinae**].—*Skand. VetTidskr.* **33.** 281–302. [In Swedish : English summary]. **2179**

Owing to the growing scarcity of meat and in view of the size of the fox farm industry, it is likely that much fox flesh is now used for human consumption in Sweden. It is, therefore, important to assess the incidence of trichinosis in foxes. During three months in the winter of 1942-43, H. examined the carcasses of 7,041 foxes which were sent to Norrköping, and found trichinosis in 270 (3·84%) out of 7,025 farmed foxes and in seven (43·75%) of 16 wild foxes. The infected farm foxes came from 27 fox farms in southern and south-eastern Sweden. The average percentage of infected foxes coming from these farms was 16, but a few consignments proved to be 100% infected. The proportion of infected foxes rises during the pelting season on farms where pelted carcasses are fed back to the stock. H. carried out careful retests using tissue from every group of muscles, in order to find the best site for routine examination. [The standard routine is not specified.] The anterior tibial muscle was found to be most heavily parasitized, followed by the ilio-psoas, gracilis, and other muscles of the limbs, and then the diaphragm. H. also calculated that a single test is likely to yield a negative result unless the density of infection is at least 2,500 trichinae per kg. of muscle.

Pigs are not regarded as an important source of trichinosis for man, as 26 years' observations have

shown an incidence of only 0·00578% of trichinosis in swine slaughtered at Norrköping.

There have been 69 reported cases of trichinosis in man in Sweden during the past five years, but the incidence is probably higher. Everything points to the fox, particularly the wild fox, as the greatest reservoir of trichinosis. H. advocates that fox trichinosis should be made notifiable. In order to make fox flesh safe for consumption, it is necessary either to cook it well or to keep it in cold storage, a temperature of −20°C. for 26 days having been found adequate to kill all trichinæ.
—J. E.

Lima, J. P. (1942). Peste de secar (verminose gastro-intestinal dos bovinos). [**Parasitic Gastro-Enteritis of Cattle**].—*Bol. Minist. Agric., Rio de J.* **31**. No. 4. 17–22. **2180**

This article deals with the symptoms, transmission, prophylaxis, and treatment of gastro-intestinal helminthiasis of cattle. The nematodes concerned in Brazil are strongyles of the genera *Trichostrongylus*, *Haemonchus*, *Cooperia*, *Ostertagia*, and *Bunostomum*.
—I. W. Brocklehurst.

Cassamagnaghi, A. (1943). Gongylonema pulchrum en los bovinos y ovinos del país. [*G. pulchrum* **Infestation of Cattle and Sheep in Uruguay**].—*Bol. mens. Direcc. Ganad., Montevideo.* **27**. 220–224. **2181**

C. describes *G. pulchrum* in detail. This parasite is frequently found in the epithelium of the oesophagus of cattle and sheep slaughtered in Uruguayan abattoirs.
—Miller Watson.

See also abstr. **2189** (parasites of Minnesota deer), **2300-2304** (anthelmintics), **2332**, **2333** (technique).

SPONTANEOUS AND TRANSMISSIBLE NEOPLASMS AND LEUCAEMIAS [INCLUDING FOWL PARALYSIS]

Kenny, J. E. (1944). **Some Observations on Bovine Neoplasia.**—*Vet. Rec.* **56**. 69–71. **2182**

In the course of examination for TB. of viscera from 21,592 cattle, 214 cases of neoplasia were found. The number of confirmed TB. cases was 17,705, and in this group, ten cases of coexistent neoplasia were seen. It was further noted that the age groups showing the lowest percentage incidence of TB. showed the highest percentage incidence of neoplasia.

A general classification of the tumours examined is given. Squamous-cell carcinoma was the most common (92 cases), followed by liver cell carcinoma (48 cases), lymphocytoma (34 cases), and adeno-carcinoma (18 cases). The remaining nine types were all below 4% incidence. Brief descriptions are given of the macroscopic and microscopic appearances of some of the principal types, particularly as they affect the liver, lungs, lymph nodes, and serous membranes.

K. comments on the extraordinary range of variation in structure, behaviour, and evidence of malignancy exhibited by various tumours of identical cell type, and states that this is due to host immunity and resistance.

Finally, there is a short section on differential diagnosis between neoplasms and granulomas.
—John G. Campbell.

Barratt, M. K., Dalton, A. J., Edwards, J. E., Greenstein, J. P., & Briggs, V. C. (1944). **A Transplantable Osteogenic Sarcoma Originating in a C3H Mouse.**—*J. nat. Cancer Inst.* **4**. 389–402. [Authors' summary copied *verbatim*]. **2183**

The history, pathology, cytology, and phosphatase activity of a spontaneous, transplantable, osteogenic sarcoma are reported.

The primary tumor, the early generations of subcutaneous transplants, and the pulmonary metastases arising from them consisted of malignant osteoblasts, osteoid tissue, and true bone. The early generations of transplants were characterized by a moderate growth rate and the possession of a high alkaline phosphatase activity.

With a rapid increase in growth rate in later generations, the high alkaline phosphatase activity and the capacity of forming osteoid tissue characteristic of the early generations were either inhibited or lost. Coincident with the increase in growth rate, early metastases to regional lymph nodes as well as to the lungs were noted.

The significance of these observations as they relate to the question of the cell of origin in osteogenic sarcoma is discussed.

Gross, L. (1943). **Intradermal Immunization of C3H Mice against a Sarcoma that Originated in an Animal of the Same Line.**—*Cancer Res.* **3**. 326–333. [Author's summary copied *verbatim*]. **2184**

One hundred and fifteen mice of the C3H inbred line were inoculated intradermally with doses varying from 0·01 to 0·03 cc. of a 20 per cent cell suspension of a sarcoma that had been originally induced by methylcholanthrene in an animal of the same line. The resulting intradermal tumors regressed spontaneously in 21 animals.

Repeated intradermal reinoculation with the same sarcoma of most of the animals that recovered were, with few exceptions, unsuccessful. Five of those that recovered were also reinoculated subcutaneously with the sarcoma, and 4 of them proved resistant. All control animals, inoculated simultaneously by the same routes and with equal amounts of the same tumor suspensions, developed sarcomas.

Since all animals, including the one in which the tumor originated, were of the same inbred line, the experiments reported in this study suggest that immunity resulting from intradermal immunization is directed specifically against the tumor used for inoculation, and does not depend upon genetic differences between the animal inoculated and the one that originally produced the neoplasm.

The theoretical significance of these observations is discussed, and the importance of accurate dosage in the study of experimental tumor immunity is emphasized.

White, J., Mider, G. B., & Heston, W. E. (1944.) **Effect of Amino Acids on the Induction of Leukemia in Mice.**—*J. nat. Cancer Inst.* **4**. 409–411. [Authors' summary copied *verbatim*]. **2185**

Strain dba mice painted with methylcholanthrene developed essentially the same incidence of leukemia on diets with or without adequate lysine.

The data suggest that cystine played a role in the development of induced leukemia perhaps not associated with its properties as an essential amino acid for growth, but with some other undetermined property.

The addition of gelatine to a low cystine diet altered the occurrence of leukemia following methylcholanthrene painting from 10 to 32 percent. This increase was attributed to the small amount of cystine present in gelatine.

The incidence of leukemia in methylcholanthrene-painted mice was increased to the same extent when the low cystine diet was supplemented with methionine as with cystine.

WHITE, F. R., & WHITE, J. (1944). **Effect of Diethylstilbestrol on Mammary Tumor Formation in Strain C3H Mice Fed a Low Cystine Diet.**—*J. nat. Cancer Inst.* **4.** 413–415. [Authors' summary copied *verbatim*]. **2186**

In strain C3H virgin female mice fed a low cystine diet spontaneous mammary-gland tumor formation was completely prevented. This suppression was shown to be due, in part at least, to lack of estrus, since diethylstilbestrol pellets implanted subcutaneously raised the incidence of tumor formation from 0 to 44·7 percent.

HESTON, W. E., & ANDERVONT, H. B. (1944). **Importance of Genetic Influence on the Occurrence of Mammary Tumors in Virgin Female Mice.**—*J. nat. Cancer Inst.* **4.** 403–407. [Authors' summary copied *verbatim*]. **2187**

Two inbred strains of mice, A and C3H, were studied. Both are high-mammary-tumor strains but differ in that whereas both the breeding and the virgin females of strain C3H have a high incidence of mammary tumors, only the breeding females of strain A have a high incidence. Few mammary tumors develop in the virgin strain A females.

Reciprocal crosses between the two strains demonstrated that this difference was due largely to a difference in genic complex influencing tumor development. In degree of susceptibility to mammary tumors the F_1 hybrid virgin females were intermediate between the parent strains although more like the parent strain C3H.

Reciprocal foster nursing between the two strains did not give conclusive evidence of a difference in the mammary-tumor agent in the milk of the two strains.

BURDETTE, W. J. (1943). **The Inheritance of Susceptibility to Tumors Induced in Mice. II. Tumors Induced by Methylcholanthrene in the Progeny of C3H and JK Mice.**—*Cancer Res.* **3.** 318–320. [Author's summary copied *verbatim*]. **2188**

1. Progeny of C3H and JK mice had average and median appearance times for tumors induced by methylcholanthrene intermediate to those of the parental strains.

2. The survival time of F_1 mice with tumors was longer than that of either parental strain.

3. The predominant type of tumor as judged by single microscopic sections was the same as that of the JK parents.

4. No evidence for linkage of susceptibility factors to the x-chromosome or for the presence of extrachromosomal influence was found.

5. The results obtained with the mice studied are compatible with the existence of more than one gene for susceptibility to induced tumors, at least one of which is recessive.

DISEASES, GENERAL

FENSTERMACHER, R., OLSEN, O. W., & POMEROY, B. S. (1943). **Some Diseases of White-Tailed Deer in Minnesota.**—*Cornell Vet.* **33.** 323–332. **2189**

The results are summarized of P.M. examinations made on about 80 deer from deer ranges over a period of seven years. The period of greatest mortality is winter (when temperatures of 50°F. below zero were recorded), 44 deaths resulting from exposure and starvation, mostly in fawns unable to reach the graze line. Thirteen animals were killed by cars at night, and other causes of death included internal haemorrhage (two cases), blindness (three cases, one considered congenital), hernia (one case), heart valve deficiency (one case), sarcoma (one case), and pasteurellosis (one case). In eight cases no diagnosis was made.

Parasites of the deer included the nose bot *Cephenomyia phobifer* which was not very pathogenic (19 cases), the biting louse *Tricholipeurus virginianus* (44 cases), the sucking louse *Cervophthirius crassicornis* (8 cases), *Echinococcus* cysts (2 cases), and *Fascioloides magna* (19 cases). In *Fascioloides* infestation, cystic dilation of bile ducts was a marked lesion, the cavities thus produced sometimes becoming closed.

Bacteriological studies of many of the carcasses were made, although some were probably unsuitable by the time cultures could be taken. *Pasteurella boviseptica* was isolated from the heart blood of one case. *Bacterium coli* was isolated from heart blood on three occasions and staphylococci on six occasions. Antibodies to *Brucella abortus* and to *Past. tularensis* were absent [this area is accredited brucella-free for cattle and pigs].

Erythrocyte counts (made from oxalated blood) of six healthy deer ranged from 5½ to 10 million per ml. Leucocyte counts made were unsatisfactory.—R. M. A.

*STENIUS, P. I. (1941). **[A Disease of Horses in Finland in 1926-40 with Brain and Liver Symptoms].**—*Suom. Eläinlääkäril.* p. 168. [Abst. from abst. in *Rec. Méd. vét.* **119.** 72]. **2190**

An "encephalo-hepatitis" which has appeared as an epizootic in Finland since 1926, is described. The morbidity varies from year to year, and altogether 1,600 cases were observed up to 1940, the mortality rate being 80–90%. The initial symptoms are not specific, but within a few hours the affected animal is either prostrate or in distress, bowel movements are suppressed, colic may be present, and the conjunctivae are icteric. There is total blindness, and death usually supervenes within 24 hours. There is no pyrexia. Transmission experiments have proved negative, and treatment is useless. The cause remains unknown.—ALASTAIR N. WORDEN.

LIMA, J. P. (1940). Pneumo-enterite dos bezerros. **[Pneumo-Enteritis in Calves].**—*Bol. Minist. Agric., Rio de J.* **29.** No. 10. 37–43. **2191**

This article deals with pneumo-enteritis of calves, a disease which arises as a result of the normal bacterial inhabitants of the lungs or intestines assuming pathogenic properties, when the resistance of the host is lowered. Among the many predisposing factors mentioned are low temperature, damp buildings, ectoparasites, and improper feeding, including lack of colostrum.

The hyperacute case is characterized by fever, diarrhoea, and a course of 2–3 days. Acute cases are characterized by diarrhoea and occasionally dysentery, but fever is not constantly present. Chronic cases are characterized by joint lesions, subcutaneous abscesses, and emaciation. Pneumonia may occur as a complication of any of the above types, or it may occur separately.

L. deals with the measures which should be taken to prevent epidemics of pneumo-enteritis, including vaccination of cows, and sero-vaccination of calves. Symptomatic treatment is discussed.

—I. W. BROCKLEHURST.

HAYSTON, J. T., HINDMARSH, W. L., & WALKER, D. J. (1942). **An Obscure Disease of the Central Nervous System of Sheep.**—*Aust. vet. J.* **18.** 115–120. **2192**

About 800 Corriedale sheep died among a flock of 14,000 near Narrabri, N.S.W., in 1940. The disease commenced in April and ceased in October. Cattle

and horses in the same paddock and on the same feed and water were unaffected. Drought prevailed throughout, but the disease occurred whether the sheep were hand fed or not. Death usually occurred within 48 hours of the onset of symptoms and no recoveries were observed. Affected sheep showed incoordination, and a peculiar type of dyspnoea was common; the animal then went down and the head was markedly retracted; finally, the animal lay on its side, showing muscular rigidity and, if stimulated, tetanic convulsions. Autopsy revealed oedema of the brain and some excess fluid in the ventricles and subdural spaces. "Cuffing", cellular infiltrations, and demyelination were not present, but some of the larger neurones, especially the Purkinje cells of the cerebellum, were considered to show slight degenerative changes. The stomach and intestines were congested and the mesenteric lymph nodes were enlarged and oedematous. Other slight lesions were inconstant.

Efforts to transmit the disease to other sheep by numerous means, including contact, drenching with ingesta, injections of blood, nasal exudate, cerebrospinal fluid; and brain substance, and intracranial injections of brain material and filtrates, were all unsuccessful. Full bacteriological and biochemical examination of the tissues, body fluids, and excretions of affected animals failed to reveal the cause and no rickettsia were seen. No plant or mineral poison could be incriminated. The cause of the disease was not discovered.—D. A. GILL.

MELASS, V. H. (1942). **Further Investigations of the Cause of the Stiff-Lamb Disease.**—*Cornell Univ. Abstr. Theses, 1941.* pp. 484–488. **2193**

"Stiff-lamb" disease is an ailment of unweaned lambs up to about two months of age in which there is coagulation degeneration of skeletal, and occasionally of cardiac, muscle fibres, so that the lambs show bilateral stiffness of the limbs. The disease can be produced in the offspring by feeding the ewes during pregnancy and the suckling period on a ration of barley, oats, cull beans, and alfalfa hay, but not by feeding a ration of oats, wheat bran, corn silage, and mixed clover-Timothy hay. The production of "stiff" lambs did not occur when cod liver oil was added to the second ration, nor when dibasic sodium phosphate was added to the first ration. There was apparently no relation between the amounts of the rations fed and the production of "stiff" lambs. The factors responsible for the production of affected lambs were not identified, but several possible factors were indicated. Of these, high protein content of the ration was not apparently significant, but further experiments were needed to determine whether cystine deficiency was important, as alfalfa hay is deficient in this substance. The presence of toxic substances in the "stiff-lamb"-producing ration was considered possible, and the question of mineral imbalance to need further study.—E. COTCHIN.

BRUGER, M., WRIGHT, I. S., & WILAND, J. (1943). **Experimental Atherosclerosis. V. Effect of Testosterone Propionate and Estradiol Dipropionate on the Cholesterol Content of the Blood and the Aorta in Castrate Female Rabbits.**—*Arch. Path.* **36.** 612–614. [For part IV, see *V. B.* **12.** 503]. **2194**

Removal of the ovaries from young rabbits had no effect on the cholesterol content of the blood or of the aorta. Administration of testosterone propionate and oestradiol dipropionate to these animals at frequent intervals over a period of 100 days also had no effect on the cholesterol content of the blood or aorta.

Feeding of cholesterol caused hypercholesteraemia and increased deposition of cholesterol in the aorta equally in female rabbits with or without gonads. It had previously been observed that both the androgenic and oestrogenic hormones exerted an inhibitory effect on cholesterol deposition and blood cholesterol level in animals fed cholesterol. This protective action was abolished when the gonads were removed.

—E. G. WHITE.

POST, J., & PATEK, A. J., Jr. (1943). **Serum Proteins in Relation to Liver Disorders.**—*Bull. N.Y. Acad. Med.* **19.** 815–830. **2195**

A review article which contains some summaries of original data. The following conclusions are drawn:—the liver is the probable site of formation of serum albumin, fibrinogen, and prothrombin; in acute liver disease, blood fibrinogen and prothrombin levels may be reduced, serum albumin slightly reduced, and serum globulin raised; in chronic liver disease, especially cirrhosis, serum albumin is reduced to a degree which may be correlated with the severity of the process, whereas serum globulin is normal or increased; patients with hepatic cirrhosis can absorb and retain protein, but their ability to synthesize serum albumin is defective.

—ALASTAIR N. WORDEN.

WITTS, L. J. (1944). **Some Problems of Infective Hepatitis.**—*Brit. med. J.* June 3rd. 739–743. **2196**

Much of the information in this article is derived from reports from the Mediterranean theatre of operations where infective hepatitis forms one of the major medical problems of the war. The paucity of knowledge concerning the disease is stressed in sections discussing the clinical features, duration and treatment, predisposing factors, and epidemiology. The condition is endemic throughout the whole Mediterranean area. In some outbreaks, racial differences are apparent, yet the much higher incidence in British Army officers and R.A.F. flying personnel (as compared with that in ordinary ranks and ground staffs) can hardly be explained by inborn differences in susceptibility, and it is suggested that feeding habits may be responsible: ordinary ranks use their own individual mess tins, whereas those who live in messes use communal crockery. No such difference in incidence is noted between officers and men in the U.S.A. and New Zealand forces.

From such facts as the sharp decline in incidence following the first December frosts, reminiscent of poliomyelitis, it is suggested that the question of an insect vector, notably flies, be investigated. Statistical investigations into herd susceptibility and into the effect of season are also urged, since direct experimentation is at present limited to the use of human volunteers.

—ALASTAIR N. WORDEN.

LESCHER, F. G. (1944). **The Nervous Complications of Infective Hepatitis.**—*Brit. med. J.* April 22nd. 554–556. **2197**

Previously published cases of nervous complications following Weil's disease and following epidemic hepatitis are reviewed, and reports are added of a case of meningitis following Weil's disease and of two cases of epidemic hepatitis complicated by parenchymatous disease of the nervous system, *viz*, polyneuritis in a 28-year-old woman, and hemiplegia in a 24-year-old man.

It is suggested that if the presence of latent jaundice were looked for in all cases of infective nervous disease of doubtful aetiology, more examples of the association might be revealed. The possibility that the hepatitis and the nervous disturbance are due to coincident but unrelated processes is regarded as unlikely.—A. N. W.

BEATTIE, J., & MARSHALL, J. (1944). **The Aetiology of Post-Arsphenamine Jaundice.**—*Brit. med. J.* April 22nd. 547–550. **2198**

The literature relating to post-arsphenamine jaundice is reviewed, and 119 additional cases obtained

from hospital records are summarized. It is concluded that in the present state of knowledge, the existence of two diseases, "X" and "Y", must be postulated. "X disease", or infective hepatitis, has an incubation period of about 28–30 days, and is transmitted by contact. Cases which are not severe enough to become icteric nevertheless develop immunity to reinfection. "Y disease", which is held to cover late post-arsphenamine jaundice and also homologous serum jaundice, has an incubation period of 80–100 days, and is transmitted by inoculation of infective material. There is no evidence of cross-immunity between "X" and "Y", and reported relapses of "Y disease" are in most cases explicable on the grounds of infection with "X disease". Up to the present, however, there are no clinical, biochemical, or pathological means of distinguishing between the syndrome of "X" and that of "Y", and final proof of the non-identity of these conditions awaits further investigation.—A. N. W.

KING, J. D. (1942). **Concussion of the Lung.**—*Surgery*. **12**. 415–418. **2199**

A brief general account of "blast injury" to the lung is given, and the possible similarity to "blast injury" of certain peace-time injuries is mentioned.
—E. COTCHIN.

JAFFE, H. L., & BODANSKY, A. (1943). **Diagnostic Significance of Serum Alkaline and Acid Phosphatase Values in Relation to Bone Disease.**—*Bull. N.Y. Acad. Med.* **19**. 831–848. **2200**

Alkaline phosphatase activity is measured at pH 8·6 and acid phosphatase at pH 4·9 or 5·0. Alkaline phosphatase of serum is high (20–50 times normal) in Paget's disease and in rickets in young children. In both these conditions the phosphatase activity varies with the severity of the condition. Alkaline phosphatase is also raised in hyperparathyroidism, osteomalacia, non-tropical sprue, and in most sarcomas of bone. Serum acid phosphatase is high in cases of carcinoma of the prostate and the value is useful in diagnosis and in following the effects of treatment. The article forms a useful review of work on the subject.—E. BOYLAND.

*GARTEN, L. (1941). Pathologie des Ejakulates und der Samenzellen der männlichen Haussäugetiere. **[Pathology of the Spermatozoa of Domestic Mammals]**.—*Inaug. Diss., Hanover*. [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **50**. 14]. **2201**

To obtain an unaltered, uncontaminated ejaculate without injuring the animal it is best to use the artificial vagina. The quantity of the ejaculate varies from individual to individual and within a species. When amounts less than 2 ml. are obtained from bulls, 30 ml. from stallions and 0·7 ml. from small ruminants, the fertility of the sperm is doubtful. Colour varies with the species. The ejaculate is pathological if milky, greenish-yellow and iridescent, whey-like, or watery. Motility is influenced by sperm density and by contamination. Viability is reduced by contamination or lack of oxygen. Complete immotility or inadequate progressive motion or rotation occur mostly in pathological or atypical specimens and these are unlikely to be fertile. Pathological or atypical spermatozoa occur, however, in every ejaculate; if the proportion is greater than 20–30%, the ejaculate is defective.—J. A. LAING.

BEESON, W. M., PENCE, J. W., & HOLM, G. C. (1943). **Urinary Calculi in Sheep.**—*Amer. J. vet. Res.* **4**. 120–126. **2202**

Urinary calculi in sheep are generally considered to be due to mineral imbalance caused by diet, abnormal hormonal control of mineral metabolism, or defective supply or utilization of vitamins, particularly of vitamins A and D. The authors have attempted to induce calculus formation by feeding wether lambs, weighing about 70 lb., a basal ration of low vitamin A content supplemented in each of the following ways:– 10% cottonseed meal + 10% linseed oil meal, 20% wheat bran, 2% ground oyster shell, 1% magnesium carbonate, 3% steamed bone meal, 1% of a commercial carotene preparation containing 2,000 U.S.P. units of carotene per gramme, 0·25% flowers of sulphur (effect of rumen synthesis of sulphur-containing amino acids on the kidney), or 4 g. silica in the form of waterglass. The experiments were spread over two successive winters and 48 lambs were used. In addition to analyses of food and water there were frequent blood and urine studies, P.M. examinations at the end of the experiment, and histological examination of the kidneys.

Only one calculus was found in the whole series: it occurred in a lamb receiving a diet supplemented with bran and with vitamin A. These experiments suggest that mineral imbalance of the kind likely to occur under practical conditions is unlikely to cause calculus formation.

During both seasons, observations were also made on 50 rams of the University of Idaho stock and four cases of urinary calculi were encountered, the stones being composed in each case mainly of silica—about 94% of the ash content. There are no details of the exact position, size, and number of the stones. It should be stressed that the rams of the University stock were fed a balanced diet and that no siliceous stones occurred in the experimental animals given waterglass in the drinking water. The addition of magnesium carbonate for removal of silica from water used in industrial boilers suggested to the authors that high urinary magnesium may have a similar effect on urinary silica, causing its precipitation and subsequent calculus formation. There is no definite evidence in the present study to support this view.

Urine samples were collected by using an ordinary human female urinal fixed by suitable straps (illustrated).—E. G. WHITE.

MCINTOSH, J. F. (1942). **The Classification and Chemical Pathogenesis of Urinary Calculi.**—*J. clin. Invest.* **21**. 755–761. **2203**

Current methods of classifying urinary calculi [presumably from human beings] are discussed, and another method, illustrated by treatment of a series of 100 calculi, is put forward, as follows. Class A (organic stones)—(1) stones containing uric acid, (2) cystine stones; class B (primary calcium stones)—(3) calcium oxalate stones, (4) primary calcium phosphate-carbonate stones; class C—(5) magnesium stones. Stones containing carbonate and phosphate are placed in either B or C, depending upon the presence or absence of magnesium. In the 100 stones reviewed, the distribution among the five groups is given as 11, 1, 50, 9 and 29, respectively. Of the 11 group (1) stones, ten are stated to have consisted almost entirely of uric acid, the other being of ammonium urate. The single class (2) stone is stated to have consisted of almost pure cystine, and to have been obtained from a patient with a history of recurrent lithiasis. The subdivision of the primary calcium stones into (3) and (4) is upheld partly on the grounds that the identity of the oxalate component should not be lost, especially for therapeutic reasons.

Of the 50 group (3) stones, 19 occurred in the kidney, 28 in the ureter, 2 in the bladder, and 1 in the prostatic urethra. Of the 29 group (5) stones, 13 occurred in the kidney, 5 in the ureter, and 11 in the bladder. In this group, magnesium and ammonia appeared to be present in parallel amounts, a finding which is cited as evidence against the frequently made

statement that magnesium phosphate [presumably $Mg_3(PO_4)_2$] is a constituent of such stones.—A. N. W.

I. Purves, H. D. (1943). **Studies on Experimental Goitre. IV. The Effect of Di-Iodotyrosine and Thyroxine on the Goitrogenic Action of Brassica Seeds.**—*Brit. J. exp. Path.* **24.** 171–173. [For previous parts, see *V. B.* **12.** 509]. **2204**

II. Griesbach, W. E., & Purves, H. D. (1943). **Studies on Experimental Goitre. V. Pituitary Function in Relation to Goitrogenesis and Thyroidectomy.**—*Ibid.* 174–184. **2205**

III. Griesbach, W. E., & Purves, H. D. (1943). **The Assay of Thyrotropic Activity by the Cell Height Response in Guinea-Pigs.**—*Ibid.* 185–192. **2206**

IV. Whitehead, V. I. E. (1943). **Basal Metabolism of the Albino Rat Fed on Goitrogenic Diet.**—*Ibid.* 192–195. **2207**

I. It has already been shown that ingestion of various brassica seeds produces a rapid hyperplasia of the thyroid [see Kennedy & Purves—*V. B.* **12.** 509]. The effects of injections of iodide, di-iodotyrosine and of thyroxine on the goitrogenic action of a rape seed diet on rats are now reported. The iodide and the di-iodotyrosine injections produced equivalent effects, both reducing the weight response and modifying, but not preventing, the hyperplasia. Injection of thyroxine in daily doses of 3·0 μg. per 100 g. body weight completely inhibited the thyroid hyperplasia usually induced by the rape-seed diet. Daily doses of 2·5 μg. per 100 g. body weight gave varying results, sometimes inhibiting the action and sometimes not.

It is considered that the seeds contain a substance which, after absorption, inhibits and interferes with the synthesis of thyroxine. The resultant fall in the level of thyroxine in the circulation induces histological changes in the pituitary identical with those produced by thyroidectomy. The pituitary responds by an outpouring of thyrotropin which acts on the thyroid and produces the hyperplasia.

II. It is shown that in rats with thyroid hyperplasia produced by a rape-seed diet the serum has a much greater thyrotropic activity than that of normal rat serum. In fact, the thyrotropic effect was equivalent to that of thyroidectomized rats. The sensitivity of the rat thyroid was not increased by the rape-seed factor; therefore, it is concluded that the thyroid hyperplasia which is produced by such diets is entirely due to increased thyrotropin secretion by the pituitary.

Thyroidectomy in rats on a diet not containing meat meal caused a great reduction in the pituitary thyrotropin with almost complete disappearance of acidophile substance. When a meat meal diet was fed, the changes were only moderate, probably due to small amounts of thyroxine in the meat meal. Goitrogenesis produced by the rape-seed diet was accompanied by varying degrees of reduction of pituitary thyrotropic and acidophile substance, suggesting that the thyroid hyperplasia caused by this diet is secondary to impairment of thyroxine synthesis.

A quantitative investigation was made of the four changes produced by thyroid disturbances, *viz*, increase of serum thyrotropin, depletion of pituitary thyrotropin, increase in number and activity of pituitary basophile cells, and degranulation of pituitary acidophile cells. The correlations observed are ascribed to thyroxine deficiency and it is pointed out that they cannot be used to locate the site of production of thyrotropic hormone.

III. The technique is described for the assay of thyrotropic activity by measuring the thyroid acinar cell heights by projection of sections on to a white screen at a magnification of × 1,000 and the use of a transparent scale. It is suggested that not more than 20 acini from each animal need be measured. In animals treated with small doses of thyroxine from the third day after birth, until they are killed at about four weeks of age, or with five doses of iodide given every second day beginning at the third day of age, the cell height response was greater to injected thyrotropin, but the thyroid weight was decreased due to colloid loss offsetting the effect of cell hypertrophy. It is concluded that the iodide-treated g. pig is a suitable animal for assays of thyrotropic activity by cell height response.

IV. It was found that the oxygen consumption of rats fed a goitrogenic brassica seed diet was within the limits accepted as normal for animals of the same weight and sex. Data obtained from thyroidectomized animals fed on the brassica diet indicate that there is no factor in the diet which inhibits the action of injected thyroxine on the peripheral tissues, and it is concluded that the hyperplasia produced by the diet is not accompanied by increased thyroxine secretion.—R. Allcroft.

Endicott, K. M., Kornberg, A., & Daft, F. S. (1944). **Lesions in Rats Given Sulfathiazole, Sulfadiazine, Sulfanilamide, Sulfamerazine, Sulfapyrazine, or Acetylsulfadiazine in Purified Diets.**—*Publ. Hlth Rep., Wash.* **59.** 49–54. **2208**

In extension of the earlier work on sulphaguanidine [see *V. B.* **13.** 396, abst. 2669.] a histological study was made of rats, to the synthetic diets of which sulphathiazole, sulphadiazine, sulphanilamide, sulphamerazine, sulphapyrazine, or acetyl-sulphadiazine had been added at the level of 1%. The groups employed for the different drugs were unequal, and the basal purified diets in different experiments were not uniform, so that it is not possible to draw exact comparisons between the effects of the different sulphonamides. The following lesions were encountered with some or all of the drugs employed:– depletion of mature granulocytes in the bone marrow (the earliest change), with or without an increase in the numbers of nucleated red cells; necrosis and calcification of skeletal muscle; calcification and hyalinization of pulmonary, coronary, and renal arteries; hydropic degeneration and hyaline necrosis (predominantly centrolobular) of the liver cells; intratubular deposits of sulphonamide in the kidneys, with varying degrees of tubular damage; hyaline necrosis of the adrenal cortex cells (infrequent); and thyroid hyperplasia.

Clinically, sluggish behaviour, coldness of the extremities and exophthalmos were frequently noted. The prothrombin time was prolonged, and there were haemorrhages into various tissues and body cavities.
—Alastair N. Worden.

Gerstl, B., & Tennant, R. (1943). **The Cellular Response to Some Methylated Long Chain Fatty Acids.**—*Yale J. Biol. Med.* **15.** 347–351. **2209**

It is known that cellular response to any fatty acid injected parenterally varies with its chain length, acidity, and physical state [see Hirsch—*V. B.* **14.** 19]. Results are given of the tissue response to eight fatty acids varying in length from 18–26 carbon atoms in the fundamental chain length. Two series of each of the fatty acids of 22, 24, and 26 carbon atoms were used, one having the methyl group attached in the α-position, the other in the 10-position. The respective acid was neutralized with NaOH and suspended in saline, and 1 ml. of the suspension containing 16 mg. of acid was injected intraperitoneally into rabbits on each of ten consecutive days. Nonspecific necrosis was the main feature of the lesions produced by the acids of 19 and 21 C atoms of the α-methylated fatty acids of C–19 to C–27, the necrosis diminishing with increase in length

of C chain, being absent in the 27 C atom acid. Giant-cell formation appeared first with the acid of 21 C atoms and increased with increasing chain length, the response being entirely proliferative with the higher fatty acids.

In the 10-methyl substituted acids, extensive necrosis was observed with the 23 and 25 C atom acids and was less striking but still present with the 27 C atom acid. Giant cell formation was present but not conspicuous with the 23 and 25 C acids and was more noticeable only with the 27 C acid.

A study of the influence of the position of the methyl group on tissue response indicated that the stimulus to proliferation associated with the increased chain length in the case of the 27 C acid counterbalanced the necrotizing effect of the methyl group in the 10-position.

The physical state of the acid appeared to be of little significance as a factor determining tissue response in this group of fatty acids.—R. ALLCROFT.

BLUMENFELD, C. M. (1943). **Studies of Normal and Abnormal Mitotic Activity. III. The Rate and Periodicity of Mitotic Activity in Regenerating Epidermis of Healing Wounds in Rabbits.**—*Arch. Path.* **36.** 493–498. [For previous parts, see *V. B.* **14.** 127]. **2210**

Mitotic activity in the normal epidermis of the rabbit showed diurnal periodicity. Mitotic activity in regenerating epidermis was studied by producing skin wounds and examining for mitoses seven days later, *i.e.* at the time of maximal mitosis rate. The average rate of mitosis was twice that of the normal epidermis (portion of skin removed) and the diurnal periodicity persisted. Earlier work showed that the mitotic rate in epidermoid carcinoma in mice was also twice that of normal epidermis but that the diurnal periodicity was absent.

—E. G. WHITE.

MOON, V. H. (1944). **Analysis of Shock.**—*Brit. med. J.* June 10th. 773–779. **2211**

Three unrelated mechanisms may cause the clinical signs of shock following injuries, *viz*, (1) primary or neurogenic shock, (2) the effect of haemorrhage, and (3) delayed or secondary shock. These may operate singly or in combination. Each of these causes lower arterial pressure, hence they cannot be distinguished by that criterion. Loss of capillary tonus and abnormal permeability of endothelium are important factors in secondary shock, but play no part either in primary shock or in the effects of haemorrhage. Abnormal permeability disturbs the mechanism of fluid balance, leading to oedema of the viscera and to haemoconcentration. A serious derangement of renal function accompanies secondary shock. Patients who survive several days in a state of sublethal shock frequently develop the syndrome of uraemia and die of renal dysfunction. The clinical management of shock requires the recognition of the causative mechanism. Cases of primary or haemorrhagic shock, unless accompanied by extensive trauma, respond more readily to treatment than do those of advanced secondary shock. Observations on the concentration of the blood and a consideration of the time elapsed since the injury are valuable aids in determining which mechanism is the major factor causing circulatory deficiency. Loss of blood volume is an outstanding feature after haemorrhages and in secondary shock. The one is best treated by transfusion of whole blood; the other by plasma or serum.—J. M. ROBSON.

MARBLE, D. R., HARPER, J. A., & HAMMERS, E. V. (1944). **Inheritance in the Domestic Fowl of a Lethal Condition Affecting both Mandibles.**—*Poult. Sci.* **23.** 114–117. **2212**

Embryos, showing a complete absence of the lower mandible and a much deformed and smaller upper mandible, were obtained from a high producing and hatching strain of single comb White Leghorns. The abnormality was completely lethal and behaved as a simple autosomal recessive. Heterozygous embryos, chicks, and adults appeared normal in every respect, thereby preventing identification except by testing with known heterozygotes.—N. J. SCORGIE.

*STRUNJAK, Z. (1941). **[Congenital Abnormality of the Retina and Optic Nerve in a Foal].**—*Vet. Arhiv.* No. 6. p. 236. [Abst. from abst. in *Berl. Münch. tierärztl. Wschr.* Oct. 30th. 326. (1942)]. **2213**

A foal born totally blind was killed at 55 days of age. In each eye the retina was detached from the optic nerve and was arranged in an irregular fashion around the ora serrata. The peripheral area of the optic disc was covered with a black pigment and the central area was studded with minute tubercles. The left lens was luxated.—C. W. OTTAWAY.

SØRENSEN, C. F. (1943). Medfødt Papillomatose hos et Føl. **[Congenital Papillomatosis in a Foal].**—*Maanedsskr. Dyrlaeger.* **55.** 47–48. **2214**

A case record of a foal born with a large papillomatous mass attached to the underlip. The lesion was removed surgically.—J. E.

See also absts. **2341** (diseases of small domestic animals), **2337** (hill sheep diseases in Gt. Britain), **2275** ("grass sickness" of horses), **2305**, **2306** (equine myoglobinuria), **2308** (bovine puerperal haemoglobinuria), **2309** (pneumonia in cows and horses), **2307** (dry eczema), **2310** (Stuttgart disease, shipping fever).

NUTRITIONAL AND METABOLIC DISORDERS

MACDONALD, A. J. (1941). **Nutritional Experiments with Chickens.**—*Indian J. vet. Sci.* **11.** 207–238. **2215**

A series of five experiments was carried out to investigate the growth-promoting value of various supplements for chicks fed on a basal ration consisting of cereals plus liberal amounts of calcium and green food. Birds fed on the basal diet alone showed poor growth, high mortality, and poor food utilization. Satisfactory results were obtained by feeding chicks on the basal diet supplemented with separated milk only during the first six weeks, and separated milk and water from six weeks onwards. The basal ration plus soya bean meal and salt did not give as good results as the basal ration plus milk.

PHILLIPS, P. H. (1942). **Nutrition and Reproduction of Farm Animals. Third Report of the Committee on Animal Nutrition of the National Research Council.**—*Repr. nat. Res. Coun., Wash.* No. 112. pp. 8. **2216**

A brief review which discusses the relationship of energy, protein, certain minerals, and vitamins A, C, and E to reproduction in farm stock. Most of the literature upon which it is based has already been abstracted for this *Bulletin*. There is reference, however, to two unpublished research projects in Wisconsin: in the first of these it has been found that vitamin C is helpful in maintaining fertility in the stallion, jack, and boar, and in the second vitamin E has been found of no value in the correction of bovine infertility, either in the male or in the female.—ALASTAIR N. WORDEN.

LONGINI, J., & JOHNSON, V. (1943). **Increased Red Blood Cell Fragility after Fat Ingestion.**—*Amer. J. Physiol.* **140.** 349–353. **2217**

The fragility of red blood cells mixed with lipaemic serum (obtained from dogs 2–4 hours after a meal comprising 10 ml. maize or olive oil per kg. body weight) was much greater than when they were mixed with a "fasting" sample of serum from the same animal. Carbohydrate and protein meals did not similarly influence the power of the serum. It is suggested that free fatty acids and soaps were the responsible agents in the lipaemic serum.—A. N. WORDEN.

MILLS, C. A. (1944). **Environmental Temperature and Protein Requirement.**—*Arch. Biochem.* **3.** 333–336. **2218**

Provided adequate amounts of vitamin B_1 and choline were fed, weanling male rats grew as well at 91° as at 68°F., although their protein requirements for optimal growth were higher at the higher temperature, *i.e.* optimum growth occurred at an 18% dietary protein level at 68°F., but at a 36% level at 91°F. This difference in protein requirement could be eliminated by the addition of 0·2% cystine to the diet, although optimal protein intake at 68°F. was also somewhat lowered by such addition. [See also *V. B.* **13.** 396, abst. 2672.]—ALASTAIR N. WORDEN.

SHERWOOD, R. M., COUCH, J. R., JAMES, L., & CARTER, C. W. (1943). **Effect of Sulphur on Chick Nutrition.**—*Bull. Tex. agric. Exp. Sta.* No. 633. pp. 14. **2219**

Experiments to ascertain the effect of adding to the diet different amounts and types of sulphur on the vitamin requirements of chicks are recorded. 5% S gave less satisfactory gains in weight and less efficient food utilization than 2·5%. When low levels of carotene (50–125 μg. per 100 g. of food, supplied by alfalfa meal) were fed there was no evidence that the inclusion of 5% S caused any destruction of carotene, or increased the bird's requirement for this factor. In the case of vitamin D, even low levels of S increased the requirements fourfold as compared with controls receiving no S. The addition of 2·5% sulphur did not destroy the riboflavin present in the diet, nor did it affect the chicks' riboflavin requirement.—E. M. CRUICKSHANK.

WACHTEL, L. W., ELVEHJEM, C. A., & HART, E. B. (1943). **Studies on the Physiology of Manganese in the Rat.**—*Amer. J. Physiol.* **140.** 72–82. **2220**

Investigation of the possible physiological role of manganese was made on rats maintained on low manganese synthetic rations producing only 5 μg. per day of manganese and having varying Ca : P ratios of 1·4, 0·85 or 2·55. Control animals were supplemented orally with 50 μg. Mn per day.

In general appearance, the Mn-deficient rats showed signs of progressive emaciation, a poor and dirty coat, and instability. No paralysis as reported by SHILS & MCCOLLUM [*V. B.* **14.** 21.] was observed, although a noticeable weakness of the hind legs caused a decidedly impaired gait. As well as impaired growth, which was more pronounced when a high Ca : P ratio was present, Mn-deficient rats had poorer bone formation, averaging about 5% less ash. No change in bone phosphatase was found, although a two- to three-fold increase in blood phosphatase was observed. A slight progressive anaemia was noted in the deficient animals and Hb regeneration was decreased. No differences in nitrogen metabolism or basal metabolic rate were found. Injection of anterior pituitary extract to animals showing marked deficiency symptoms resulted in a slight initial increase in weight which was not obtained with succeeding injections.—R. ALLCROFT.

SULLIVAN, M., & EVANS, V. J. (1944). **Nutritional Dermatoses in the Rat. IX. Evaluation of the Interrelationship of Magnesium Deficiency and Deficiencies of the Vitamin B Complex.**—*J. Nutrit.* **27.** 123–139. [For part VIII, see *V. B.* **13.** 436]. **2221**

In rats given from weaning a purified diet, containing no Mg in the salt mixture and having adequate supplements of vitamins A, D, E, and B complex and cystine, signs of Mg deficiency appeared in 2–3 days and convulsive attacks occurred after one week. The earliest cutaneous symptom of erythema appeared after 4–8 days and erythematous areas soon became oedematous. A comparative study of the skin lesions with those occurring in various forms of deficiency of members of the vitamin B complex showed that the closest resemblance was to those occurring in deficiency of vitamin B_6. The symptoms of Mg deficiency could, however, be differentiated readily. In acute Mg deficiency the moisture and ash contents of the skin were not significantly lower than in normal animals.

No effect was observed on the symptoms of Mg deficiency when the diet was deficient in B vitamins or when massive doses of the B vitamins were given. Deprivation of vitamin E had no effect on the onset, duration, or severity of the Mg deficiency syndrome.—A. M. COPPING.

KRUPSKI, A., JUNG, A., UEHLINGER, E., ALMASY, F., & ULRICH, H. (1941). Untersuchungen über den Einfluss von Kalziumphosphat und Vitamin D auf die Schweinerachitis. [**Influence of Calcium Phosphate and Vitamin D on Rickets in Pigs**].—*Schweiz. landw. Mh.* **19.** 317–332. [Similar article appeared in *Schweiz. med. Wschr.* **72.** 503]. **2222**

Unweaned pigs were given a low Ca diet (0·144% Ca and Ca : P ratio of 0·35) while a control group had a normal diet (0·64% Ca and Ca : P ratio of 0·99). After two months, the experimental group showed hypocalcaemia, abnormal gait, skin changes, loss of appetite, and reduced growth. Addition of 1% Ca and vitamin D to the diet of the pigs caused rapid recovery; the addition of 0·3% Ca with vitamin D gave much slower recovery, while the addition of calcium phosphate alone did not cause recovery. The rickets developing in the experimental pigs was similar to that occurring in human beings, as shown by careful examination of the bones.—E. BOYLAND.

MITCHELL, H. H. (1943). **The Chemical and Physiological Relationship between Vitamins and Amino Acids.**—*Vitamins and Hormones.* **1.** 157–194. New York : Academic Press Inc. **2223**

The physiological relationships between vitamins and amino acids, their derivatives and aggregates, are reviewed.

Certain amino acids are needed for the biosynthesis of vitamins. β-(4-methyl-thiazolyl-5)-alanine has been shown to be convertible to thiazole by the pea root and by yeast. A further step for the synthesis of vitamin B_1 is the linking of the pyrimidine and thiazole rings. Choline is synthesized by the rat from methyl groups derived from methionine, while ethanolamine is the compound so methylated.

As indicated by appetite studies, vitamin B_1, and more particularly riboflavin, have a marked effect on protein (casein) appetite of rats. Other unknown yeast components have a definite beneficial effect as shown by the level of appetite attained following a yeast supplement. The connexion between riboflavin and protein metabolism may be closer than that of any other vitamins so far studied.

Protein-vitamin combinations catalyse many important oxidation reductions and phosphorylations.

Vitamin A_1 or A_2, in the form of conjugated carotenoid proteins, constitutes a part of the retinal mechanism. Antigen-antibody reactions can be modified in a favourable way by some of the vitamins.

The metabolism of haemoglobin and the physiological functions of the proteinogenous hormones are influenced by certain vitamins, though the details of their action have not yet been worked out.—E. Kodicek.

Braun, W., & Carle, B. N. (1943). **The Effect of Diet on the Vitamin A Content of the Bovine Fetal Liver.**—*J. Nutrit.* **26.** 549–554. 2224

Cows in the following four groups were studied :– a pasture (P) group, *i.e.* animals on natural non-irrigated pasture grass throughout the year, without supplementary feed ; a group termed (PA), maintained on the same pasture as (P) but dosed twice weekly between September and the end of November with 450,000 I.U. of vitamin A as shark liver oil ; a barn (B) group, transferred from the pasture at the beginning of September and provided with a diet deficient in vitamin A and carotene, consisting of beet pulp, cottonseed meal, and rolled barley ; and a (BA) group, treated as (B) except for being dosed twice weekly with 400,000 I.U. of vitamin A. Animals in both (PA) and (BA) maintained fairly high blood vitamin A levels throughout the winter months, whereas cows in the unsupplemented (P) and (B) groups had low levels from September onwards.

Cows in all four groups were inoculated with live cultures of *Brucella abortus* and determinations were made of the liver vitamin A reserves of the aborted foetuses. The mean vitamin A reserves for the respective groups expressed in I.U. per gramme of fresh liver were 6·6 (P), 10·7 (PA), 1·7 (B), and 14·1 (BA).

—Alastair N. Worden.

*Hautecoeur. (Undated). Avitaminose A des bovidés et des suidés. [**Vitamin A Deficiency of Cattle and Pigs**].—*Thesis, Alfort.* [Abst. from abst. in *Rec. Méd. vét.* **119.** 110 (1943)]. 2225

The relevant literature appears to have been covered, but the abstract does not mention the recording of any original data.—Alastair N. Worden.

*Daniel, H. (1943). Avitaminose A du porc. [**Avitaminosis A in Pigs**].—*Thesis, Alfort.* [Abst. from abst. in *Rec. Méd. vét.* **119.** 108]. 2226

The thesis is said to contain details not only of experimentally produced vitamin A deficiency, but also of clinical cases attributed to lack of vitamin A. Such cases include nervous, ocular, and muscular lesions in piglets, failure of growth combined with skin lesions, and abortion during the winter months. Successful treatment with cod liver oil is recorded.—A. N. Worden.

Moore, L. A., Berry, M. H., & Sykes, J. F. (1943). **Carotene Requirements for the Maintenance of a Normal Spinal Fluid Pressure in Dairy Calves.**—*J. Nutrit.* **26.** 649–658. 2227

Holstein and Ayrshire calves aged three months were placed on a basal ration low in carotene for 30 days, at which time various levels of carotene in the form of dehydrated alfalfa leaf meal were fed. At intervals, plasma vitamin A, carotene, and ascorbic acid were estimated, and the spinal fluid pressure was measured. The experiment was continued until the calves were 12–14 months old. Because of individual variations, no close correlation between plasma vitamin A values and dietary carotene could be observed, but measurement of spinal fluid pressure enabled small differences in carotene intake to be detected, and it could therefore be used as a critical index of adequacy or otherwise of carotene intake. A minimum of 66 μg. per kg. of body weight was required to maintain a normal spinal fluid pressure under the conditions of this experiment.—E. M. Cruickshank.

Jungherr, E. (1943). **Nasal Histopathology and Liver Storage in Subtotal Vitamin A Deficiency of Chickens.**—*Bull. Storrs agric. Exp. Sta.* No. 250. pp. 36. 2228

The conclusion is reached in this report that histopathological examination of the nasal tissues of chickens is an accurate index of hypovitaminosis A and that it compares favourably with observations of growth response and liver storage as a method for the estimation of vitamin A requirements, since it is more sensitive, and fewer birds and a shorter experimental period are necessary. This conclusion is based on data obtained on approximately 400 chicks from a uniform stock, which were fed on a basal diet with supplements of vitamin A ranging from 25–1,200 I.U. per head per day. Extensive histological examinations of the nasal and extranasal organs were made, and the microscopic anatomy of normal tissues as well as the nature, severity and location of lesions in varying stages of hypovitaminosis are described in detail. There are excellent photomicrographs. The lesions resembled in character, but not in severity, those which occur in total vitamin A deficiency. The constant and specific lesion consisted of genuine squamous metaplasia of the secretory and glandular epithelium, with inflammatory and obstructive changes secondary in nature. There was an inverse ratio between the average severity of the lesions and the vitamin A intake. The minimum requirement was taken as being the smallest dose capable of keeping the nasal tissues intact, and was found to be 250–350 I.U. per head per day for chicks up to eight weeks, and 400 I.U. for seven-month-old birds. If growth was used as a criterion, 100 I.U. of vitamin A per head per day up to six months appeared to meet the physiological requirements, but a number of birds on this level showed evidence of vitamin A deficiency as indicated by the presence of microscopic lesions. Comparison of the histopathological findings with the results of vitamin A determinations on the liver showed that lesions might develop before the vitamin A reserve of the liver was exhausted, but in general a low reserve was associated with a high incidence of lesions.

—E. M. Cruickshank.

Correll, J. T., & Wise, E. C. (1943). **The Comparative Toxicity of Calciferol, A.T. 10, and Cod Liver Oil Concentrate for Chicks.**—*J. Nutrit.* **26.** 641–648. 2229

Day-old chicks were maintained on a rachitogenic basal diet and the sterols to be tested were administered orally over a 21-day period. Toxicity was gauged by the appearance of the birds, failure to grow, and the number of deaths towards the end of the experimental period. Negative controls received the basal ration only. Groups receiving the basal ration plus 3 I.U. of vitamin D daily from cod liver oil served as positive controls. Under the conditions of the experiment, this amount of vitamin D was found to be the minimum required to produce normal serum Ca and phosphatase values and adequate calcification in the chicks. A cod-liver oil concentrate, containing 66,000 I.U. per g. produced toxic symptoms when 15,000 I.U. were given daily (*i.e.* 5,000 times the minimum dose), but no hypercalcaemic effect or abnormal bone ash values were observed, indicating that the toxicity may have been due to some constituent other than vitamin D. Normal values for serum Ca, phosphatase, and bone ash were found when 100 I.U. of vitamin D_2 were given daily. Toxic effects were produced with 1,000 times this dose ; there was slight hypercalcaemia and some evidence of depletion of bone salts, but serum

phosphatase remained low. Mineral metabolism was normal when as little as 0·5 I.U. daily of dihydrotachysterol was given. Toxic symptoms appeared with a dose of ten times this amount, while serum Ca increased and the bone ash values decreased. There was no increase in phosphatase. The results indicated that the influence on Ca metabolism of dihydrotachysterol resembles that of parathyroid hormone.—E. M. C.

McCHESNEY, E. W. (1943). **Studies of Calcium and Phosphorus Metabolism in the Chick. II. Relative Antirachitic Effectiveness of Vitamins D_2 and D_3 and Dihydrotachysterol Administered Parenterally.**—*J. Nutrit.* **26.** 487–498. [For Part I, see *V. B.* **14.** 23]. 2230

The requirements of the chick for vitamin D_2, vitamin D_3, and dihydrotachysterol administered in various ways are expressed as the number of U.S.P. units required per week to produce an average bone ash of 41–42% at six weeks of age, when the value of the negative controls was 31–32%. The three sterols, dissolved in propylene glycol and in some instances in maize oil, were tested by the intramuscular and intravenous routes and the results compared with previous results obtained by oral administration in maize oil. When given by any route, dihydrotachysterol was the most effective antirachitic and vitamin D_2 the least. The former was very active when given orally, being about 300% more effective than vitamin D_3, but the other two sterols were more active when given intravenously or intramuscularly in propylene glycol than when given orally in maize oil.—E. M. CRUICKSHANK.

HICKMAN, K. C. D., KALEY, M. W., & HARRIS, P. L. (1944). **Covitamin Studies. I. The Sparing Action of Natural Tocopherol Concentrates on Vitamin A.**—*J. biol. Chem.* **152.** 303–311. 2231

HARRIS, P. L., KALEY, M. W., & HICKMAN, K. C. D. (1944). **Covitamin Studies. II. The Sparing Action of Natural Tocopherol Concentrates on Carotene.**—*Ibid.* 313–320. 2232

HICKMAN, K. C. D., KALEY, M. W., & HARRIS, P. L. (1944). **Covitamin Studies. III. The Sparing Equivalence of the Tocopherols and Mode of Action.**—*Ibid.* 321–328. 2233

I. A tocopherol concentrate prepared from soya bean and cottonseed oils was fed at different levels to young rats on a vitamin A deficient diet, and to depleted rats given a single dose (50 U.S.P. units) of vitamin A. The time required for depletion of their vitamin A reserves and the time of survival after the administration of vitamin A was a few days longer than in rats receiving no tocopherol. The growth response of rats receiving vitamin A as vitamin A alcohol, vitamin A acetate, and U.S.P. reference oil was significantly improved when a supplement of tocopherol was given. The effect of tocopherol reached its maximum at about 0·15 mg. daily with the acetate, and at 0·3 mg. with the alcohol.

II. Small amounts of tocopherol exerted a sparing action when small or moderate amounts of carotene were fed. The maximum effect was observed with a daily dose of 0·5 mg. Larger amounts of tocopherol either had no influence or exerted a depressing effect. A definite ratio existed between carotene and tocopherol intakes, the potency of large quantities of carotene being enhanced by increased quantities of tocopherol.

III. Quantitative comparisons were made of the sparing powers of synthetic α- and γ-tocopherols, both free and esterified, and natural α-, β-, and γ-tocopherols, together with some of their derivatives such as tocopherol quinones. It was found that the sparing action is a property of the free tocopherols, and only to a smaller extent of their esters. The three natural tocopherols, though varying in their capacity to prevent sterility in the rat, were equally effective in sparing vitamin A. A mixture of the tocopherols, prepared from edible oils, was slightly more active than any one alone. The sparing action was diminished when the free tocopherols and vitamin A were fed on alternate days, instead of simultaneously. The tocopherol quinones were as active as the tocopherols. Some evidence was obtained that tocopherols exert their sparing action by functioning as antioxidants in and near the gastro-intestinal tract, and it is suggested that they may be of use clinically in conditions of intestinal derangement.—E. M. CRUICKSHANK.

FREI, W. (1942). Über den Einfluss des Vitamin E-Mangels auf die Infektionsresistenz speziell gegenüber Brucella Bang. **[Influence of Vitamin E Deficiency on Resistance to Brucella Infection].**—*Ref. Vitamin E-Frage in Vet.-Med., Basel, 1942.* pp. 13–16. 2234

A brief account is given of experimental studies with g. pigs in which it was demonstrated that in animals deprived of vitamin E there was lowered resistance to infections, especially to brucella infection. Recovery from infections was less satisfactory in deprived g. pigs than in animals receiving normal diet. —A. M. COPPING.

FREIRE, S. A., MAGALHÃES, B. F. (1943). O miocárdio na avitaminose E da cobáia. **[Myocarditis in Vitamin E Deficiency of Guinea Pigs].**—*Rev. brasil. Biol.* **3.** 91–98. 2235

Focal hyaline necrosis of the myocardium, and often of skeletal muscle, occurred in g. pigs fed on a diet deficient in vitamin E. Wheat-germ oil prevented the development of these lesions.—I. W. BROCKLEHURST.

DAM, H. (1944). **Studies on Vitamin E Deficiency in Chicks.**—*J. Nutrit.* **27.** 193–211. 2236

In a study of the two symptoms of vitamin E deficiency in chicks, namely exudative diathesis and encephalomalacia, it was observed that the appearance of the different symptoms could be accelerated or suppressed by changes in the diet apart from the vitamin E content. Chicks having purified rations with no added fat rarely developed exudates and never encephalomalacia, but the appearance of both symptoms was accelerated by the presence of highly unsaturated fatty acids. The fatty acids from cod liver oil, lard, and linseed oil and the unsaturated C_{20} acids, given as 5% of the diet, favoured the production of exudates, while fatty acids from pig liver caused the appearance of encephalomalacia. Oleic acid and rancid cod liver oil were ineffective in producing either type of lesions. A low carbohydrate : protein ratio in a diet with 30% lard favoured the appearance of encephalomalacia rather than exudates. The tendency to form exudates was considerably influenced by the carbohydrate : protein ratio and by the salt content of the diet. Both lesions were prevented by inclusion of 1·5% inositol in the diet, while 2% lipocaic prevented only exudate formation. Addition of 1% cholesterol to a diet with 5% cod liver oil and low salt content favoured the formation of exudates, but, in a diet with 30% lard, prevented encephalomalacia. The complex mechanism of the effects of different fatty acids and of inositol, lipocaic, and cholesterol on the development of vitamin E deficiency is discussed.—A. M. COPPING.

DEMOLE, V. (1942). Der Abort bei der E-avitaminotischen Ratte. **[Abortion in Vitamin E Deficient Rats].**—*Ref. Vitamin E-Frage in Vet.-Med., Basel, 1942.* pp. 2–5. 2237

A brief review is given of the effects of vitamin E deficiency in rats in causing the death of foetuses *in*

utero followed by resorption or abortion. Administration of vitamin E by mouth was rapidly effective in curing the condition. Vitamin E given by injection acted less promptly.—A. M. COPPING.

PAPPENHEIMER, A. M., & SCHOGOLEFF, C. (1944). **The Testis in Vitamin E-Deficient Guinea-pigs.**—*Amer. J. Path.* **20.** 239–245. 2238

When young g. pigs were given a diet lacking in vitamin E shortly after weaning, muscular dystrophy tended to develop before testicular changes were observed. The earliest appearance of degenerative changes in the testicles occurred after 130 days of deprivation and severe degeneration was found after 175 days. The testicle was shrunken, flabby, and brown. There was no spermatogenesis and the tubules were lined with abnormal cells, often containing brown pigment.—A. M. COPPING.

KAUNITZ, H., PAPPENHEIMER, A. M., & SCHOGOLEFF, C. (1944). **The Protracted Effect of a Single Dose of dl-Alpha-Tocopherol Acetate upon the Testes of Rats on Vitamin E-Deficient Diet.**—*Amer. J. Path.* **20.** 247–257. 2239

In young male rats kept on a vitamin E free diet and born of mothers receiving a vitamin E free diet with just sufficient supplement of wheat germ oil to permit gestation, administration on the fifteenth day of life of a single dose of 0·5 or 1·0 mg. *dl*-α-tocopherol acetate delayed the appearance and progress of testicular degeneration. A dose of 5·0 mg. given on the fifteenth day was even more effective, but doses given on the sixth to eighth days or the twenty-ninth to thirtieth days were much less effective in preventing degeneration.—A. M. COPPING.

QUIN, A. H. (1943). **Some Thoughts on Swine Nutrition, with special reference to Components of the Vitamin B Complex.**—*Vet. J.* **100.** 123–126. 2240

Recent experimental work is briefly reviewed on deficiencies of vitamin B_1, B_6, riboflavin, nicotinic acid, and pantothenic acid in the pig. Reference is made also to severe losses occurring in pigs which are provided with a diet consisting almost exclusively of cracked eggs. It is suggested that biotin deficiency was responsible, but apart from the statement that " liver pathology was predominant ", no details are given.—A. N. WORDEN.

KOLB, L. C., WINTROBE, M. M., MUSHATT, C., MILLER, J. L., Jr., LISCO, H., & STEIN, H. J. (1941). **Degeneration of the Primary Sensory Neurone in Pigs from Nutritional Deficiency.**—*Trans. Amer. Neurol. Ass.* **67.** 189–192. Discussion pp. 192–194. 2241

A brief summary for neurologists of some aspects of the detailed study of vitamin B complex deficiencies in the pig now in progress at the Johns Hopkins University, Baltimore.

The " neurological picture " which has appeared in animals subjected to varying deficient dietaries, manifests itself predominantly as an ataxia, first observed as excessive elevation of the legs and slapping of the hooves when walking. Next, spontaneous scratching movements of the hind limbs are seen, and eventually the animals are unable to support themselves and fall backwards on to their hams. Despite the absence of muscle wasting, weakness, or loss of perception of pain, tendon reflexes are diminished or absent. Certain animals develop chronic ulceration of the hind limbs, and others have generalized convulsive seizures.

The posterior [dorsal] columns of the spinal cord in animals which have been killed by bleeding appear a shiny translucent grey on section. Histopathological changes are evident in the peripheral nerves, posterior root ganglia, posterior roots, and posterior funiculi of the spinal cord, and consist of swelling, fragmentation or disappearance of the axis cylinders, myelin degeneration, with the appearance of Marchi granules, free fat, and loss of ability to stain by Weigert methods. There is also an increase in the number of neurilemmal cells, and phagocytic cells are visible. In the posterior root ganglia, Nissl substance is decreased and there may even be complete chromatolysis. The anterior [ventral] roots appear normal. In the cord, the changes are limited to the columns of Goll and of Burdach. It is concluded that the pigs suffer from a specific degeneration of the primary sensory neurone dependent upon a nutritional deficiency.

Some varieties of yeast are completely protective against the condition, and so are various liver fractions. A study of the degree of protection afforded by various synthetic B vitamins in combination is in progress.

In the discussion, H. M. ZIMMERMAN stressed that posterior column degeneration cannot be ascribed to deficiency of a single factor, and stated that experiments which he had been carrying out for some years with dogs practically duplicated the results of KOLB and his colleagues.—ALASTAIR N. WORDEN.

ASHBURN, L. L., & LOWRY, J. V. (1944). **Development of Cardiac Lesions in Thiamine-deficient Rats.**—*Arch. Path.* **37.** 27–33. 2242

Weanling albino rats were provided with a casein, sucrose, cottonseed oil, cod liver oil, mineral mixture diet supplemented with riboflavin, nicotinic acid, pantothenic acid, vitamin B_6, choline, and, for a short period, 4 μg. daily of vitamin B_1. The vitamin B_1 was then withdrawn from the diet, and after symptoms of acute deficiency had supervened, a single injection of 50 μg. vitamin B_1 was given. This procedure was repeated several times, during which time some animals died, and the survivors were then killed.

Most of the rats so treated had enlarged hearts, due mainly to dilatation of the right auricle. In the majority of cases, the enlarged auricles showed necrosis of muscle fibres, cellular infiltration, and evidence (*e.g.* decrease in number of muscle fibres, and a degree of fibrosis) of healed lesions. In about one-third of cases, similar changes were present in the pulmonary veins, and in a very few instances the ventricular myocardium was likewise affected.—ALASTAIR N. WORDEN.

PATRICK, H., DARROW, M. I., & MORGAN, C. L. (1944). **The Role of Riboflavin in Turkey Poult Nutrition.**—*Poult. Sci.* **23.** 146–148. 2243

Turkey poults receiving a diet containing adequate biotin but suboptimal amounts of riboflavin showed retarded growths. When the riboflavin was omitted, mortality was 100% by the fourth week of age, but there was no evidence of dermatitis. A diet containing adequate riboflavin but no biotin produced dermatitis and perosis by the end of three weeks. To determine the riboflavin requirement for growth, three-day-old poults were placed on a " practical " ration of low riboflavin content to which graded levels of crystalline riboflavin were added. Optimum growth and maximum efficiency of food utilization were obtained with 270 μg. per 100 g. of ration. At this level there was no mortality and no evidence of perosis, but perosis did occur in groups receiving lower levels.—E. M. CRUICKSHANK.

WORDEN, A. N., & SLAVIN, G. (1944). **Nicotinic Acid Deficiency in the Pig and Guinea-pig. 1. The Effects of a " Pellagra-Producing " Diet upon these Species.**—*J. comp. Path.* **54.** 77–87. 2244

A diet of white maize, pea meal, casein, and mineral mixture, when fed to young pigs, produced a condition clinically and pathologically similar to the necrotic enteritis associated with pig paratyphoid, though

Salmonella cholerae-suis was not present. The symptoms were less severe than those described by other workers using pellagra-producing diets, and during the 11th week after weaning, spontaneous recovery appeared to take place, six out of eight pigs surviving until the end of the experiment. The reason for this recovery was not clear, but the possibility existed that the animals had obtained some nicotinic acid, produced by the action of moulds and yeasts, from the pen floors.

The results of a limited experiment on g. pigs which were maintained on a pellagra-producing diet, indicated that this animal was not suitable as a test subject for nicotinic acid, although it was confirmed that a pellagra-producing diet did not support health or continued life in this species.—E. M. CRUICKSHANK.

SMITH, S. G., CURRY, R., & HAWFIELD, H. (1943). **Vitamin B_6 Deficiency Anemia in the Dog.**—*Science.* **98.** 520–522. **2245**

A basal diet low in vitamin B_6 but containing all the other known vitamins of the vitamin B complex in synthetic form, when fed to puppies and to adult dogs, invariably produced a typical hypochromic microcytic anaemia. Administration of vitamin B_6 caused a rise in haemoglobin, but this was only temporary. When 10% of the carbohydrate of the diet was replaced by yeast, the haemoglobin was restored to, and maintained at, a normal level. Evidently a factor or factors present in yeast, other than vitamin B_6 and the known members of the vitamin B complex, is necessary for normal haemoglobin formation in the dog.—E. M. C.

WEST, H. D., BENT, M. J., RIVERA, R. E., & TISDALE, R. E. (1944). **The Influence of Pantothenic Acid upon the Susceptibility to Pneumonia. (With a Note on the Mechanism of the Action of Sulfapyridine in Pneumococcic Pneumonia].**—*Arch. Biochem.* **3.** 321–324. **2246**

Young albino rats receiving a basal pantothenic acid deficient diet appeared to be somewhat more resistant than litter mate controls, receiving the basal diet plus 0·9 mg. calcium pantothenate daily, to the effects of experimental intranasal infection with 0·2 ml. of a 1 : 1 mixture of an 8% solution of mucin and a 24-hour infusion broth culture of "Robertson" strain type I pneumococcus.—ALASTAIR N. WORDEN.

CAMPBELL, C. J., BROWN, R. A., & EMMETT, A. D. (1944). **Influence of Crystalline Vitamin B_c on Hematopoiesis in the Chick.**—*J. biol. Chem.* **152.** 483–484. **2247**

Two rations deficient in vitamin B_c were used to determine the protective levels of this factor required by the chick. One was a normal broiler ration, the other a synthetic ration containing casein, gelatin, choline, cystine, starch, cellulose, lard, salts, and supplements of all the other vitamins so far known to be necessary for normal growth in the chick. Control groups were maintained on these two rations while other groups received these rations plus varying amounts of B^c for a period of four weeks. In the absence of B , there was retardation of growth, a marked decrease in haematocrit, haemoglobin, and red blood cell count and a reduction in the leucocytes and thrombocytes. Supplementation with 100 μg. of B was necessary to produce normal growth, but 40 μg. was sufficient to maintain a normal haematocrit, red blood cell, haemoglobin, and thrombocyte count. A much larger amount, *viz*, 400 μg. was required to maintain the leucocytes at a normal level.—E. M. CRUICKSHANK.

BOURNE, G. H. (1944). **Effect of Vitamin-C Deficiency on Experimental Wounds. Tensile Strength and Histology.**—*Lancet.* **246.** 688–692. **2248**

The tensile strengths of small skin wounds which had healed for a week were estimated in 52 g. pigs which had been kept for two weeks on a scorbutic diet supplemented by graded doses of vitamin C ranging from 0–30 mg. In some animals, histological examination of the scars, and in others estimation of total vitamin C in whole blood, were carried out. The tensile strength varied with the daily dose of vitamin C given, animals receiving 0, 0·5, 2·0, and 30 mg. having tensile strengths of 25·3, 118·5, 338·7, and 297 g., respectively. From these results, it appeared that, in g. pigs, saturation with vitamin C was not essential for optimum healing of wounds, 2 mg. being sufficient to secure the maximum result. Wounds in animals receiving different doses of vitamin C, though varying considerably in tensile strength, were frequently very similar in histological appearance. More reticular fibres were present in wounds having a low tensile strength. Tensile strength was correlated with total blood vitamin C. When the latter was less than 0·1 mg. per 100 ml., the tensile strength was low, but saturation with vitamin C, though it increased the amount of vitamin in the blood over that of animals receiving 2 mg. of vitamin C, did not increase the tensile strength.—E. M. CRUICKSHANK.

See also abstr. **2185** (diet and leucaemia), **2193** (diet and "stiff lambs"), **2202** (diet and urinary calculi in sheep), **2311** (diet in liver injury), **2304** (skim milk as vermifuge for pigs), **2305** (vitamin B_1 and equine myoglobinuria), **2316** (vitamin B_1, in dogs), **2312–2314** (vitamin E), **2315** (vitamin K).

PHYSIOLOGY AND ANATOMY

—. (1944). **Annual Review of Physiology. Vol. VI.** [Edited by LUCK, J. M., & HALL, V. E.] pp. vii+630. Stanford University P.O., California: Annual Reviews, Inc. [8vo]. **2249**

In this volume, the chapter of most interest to veterinarians is perhaps that on "Reproduction and its Endocrine Control", by A. S. PARKES. The aspects dealt with are the normal reproductive cycle, the physiology of the ovum and spermatozoon, and the endocrinological control of the mammary gland and lactation. Observations are restricted mainly to mammals and the literature reviewed is mostly that which appeared in 1942 and the early part of 1943.

Another interesting chapter is that entitled "Metabolic Functions of the Endocrine System", by F. G. YOUNG, in which are reviewed recent publications on the thyroid gland, the parathyroid glands, the thymus, the pancreatic islets, the adrenal cortex, the anterior and posterior pituitary glands, and the influence of sex hormones on metabolism.

In the chapter on "Blood", by A. J. QUICK, the reviewer has limited himself to one aspect of the subject, *viz*, coagulation. Other chapters deal with the following subjects :– "Developmental Physiology", by V. HAMBURGER ; "Growth. Neoplastic Growth", by J. FURTH; "Physiological Effects of Heat and Cold", by J. FIELD, 2nd, and V. E. HALL ; "Energy Metabolism", by M. KLEIBER ; "Respiration", by T. BERNTHAL ; "The Physiology of the Skin", by S. ROTHMAN and P. FLESCH ; "Digestive System", by B. SLUTZKY and A. C. ANDERSON ; "Liver and Bile", by L. A. CRANDALL, Jr. ; "Kidney", by E. BRAUN-MENENDEZ ; "Heart", by R. ASHMAN ; "Conduction and Synaptic Transmission in the Nervous System", by D. P. C. LLOYD ; "Visceral Functions of the Nervous System", by B. A. MCSWINEY ; "Vision", by F. W. WEYMOUTH ;

"Physiological Psychology", by W. FREEMAN and J. W. WATTS; "Industrial Physiology", by E. SIMONSON. Good author and subject indexes are given.—R. ALLCROFT.

ELKINTON, J. R., & TAFFEL, M. (1942). **Prolonged Water Deprivation in the Dog.**—*J. clin. Invest.* **21.** 787–794. **2250**

Four normal dogs were deprived of food and water: one died after 11 days, two were killed (one being moribund) after 15 days, and the other was taken off the experiment after 20 days. The serum sodium level rose in each case, indicating hypertonicity of the body fluids. The total water loss greatly exceeded the calculated extracellular water loss, and an attempt was made to account for the different ways in which cell water might be lost. The concentration of sodium and of chloride in the urine diminished, whereas that of urinary potassium increased.—A. N. WORDEN.

I. BERRYMAN, G. H., BOLLMAN, J. L., & MANN, F. C. (1943). **The Influence of the Liver on the Proteins of the Blood Plasma.**—*Amer. J. Physiol.* **139.** 556–562. **2251**

II. BERRYMAN, G. H., & BOLLMAN, J. L. (1943). **The Effect of Experimental Hepatitis on the Plasma Proteins of the Immature Rat.**—*Ibid.* 592–595. **2252**

III. BERRYMANN, G. H., & BOLLMAN, J. L. (1943). **The Effect of Experimental Hepatitis on the Plasma Proteins of the Pregnant Rat.**—*Ibid.* 596–599. **2253**

I. Dogs were maintained on a diet comprising ground lean horse meat, biscuit meal, cooked tomatoes, lard, and bone ash, fed once daily in amounts equivalent to twice the estimated calorific requirement of each animal. The protein content of the diet was regulated by alterations in the amount of meat fed. Plasmapheresis was accomplished by withdrawal of one-fifth to one-third of the estimated blood volume, with subsequent reinjection of erythrocytes.

Following plasmapheresis in dogs receiving a diet containing 12% of protein, there were small but consistent changes in the plasma protein picture, as determined by Howe's method, a certain amount of additional globulin appearing at the expense of the albumin fraction.

Following total hepatectomy by a three-stage method under ether anaesthesia, and with the blood sugar concentration maintained within normal limits by continuous intravenous injection of 10% glucose, the following apparent changes occurred in the plasma protein picture:—a 5–10% loss (or dilution) of total protein; a similar loss of albumin; a very variable loss, ranging from 3–100%, of euglobulin; and an increase, ranging from traces to 66%, in pseudoglobulin. These changes took place within a few hours, and only negligible further variations occurred in animals maintained alive for as long as 30 hours. When plasmapheresis was carried out after hepatectomy, a haemoconcentration occurred. In dogs with an Eck fistula, or with liver damage due to carbon tetrachloride poisoning, there was no apparent increase of pseudoglobulin following hepatectomy.

II. The diminution in plasma protein following liver damage (CCl_4 poisoning) and restriction of dietary in young rats was found to be due almost entirely to a fall in the albumin fraction. While dietary intake was diminished by poisoning with CCl_4, the fall in plasma protein was greater in such rats than in paired-fed controls, and it is suggested that the plasma protein level reflects the dietary intake.

III. When CCl_4 had been administered to pregnant rats, serum protein determinations carried out immediately *post-partum* showed a fall in total protein and in albumin, and an apparent slight rise in globulin. On P.M. examination hepatic hypertrophy was found.

Pregnancy alone produced some diminution in the globulin fraction (reflected in total protein), but little appreciable change in albumin. There was no hepatic hypertrophy.—ALASTAIR N. WORDEN.

PETERSEN, W. E. (1944). **Physiological Factors in Lactation Relating to Milking and Mastitis.**—*Cornell Vet.* **34.** 38–51. **2254**

After briefly describing the endocrine factors controlling mammary development and milk secretion, P. discusses the blood precursors of the milk constituents, the equilibrium phenomenon between the milk and the blood, and the role which this phenomenon plays in the alteration of the chemical composition of the milk in cases of mastitis. Proper milking, either by hand or by machine, depends on understanding the physiological mechanism of the "let down" of milk, and P. describes this mechanism in considerable detail and formulates a number of rules for correct milking.

[Some of the statements regarding the hormonal control of mammary development and milk secretion are rather unorthodox and, unfortunately, no references are given to the experiments on which they are based.]
—ALFRED T. COWIE.

NELSON, W. O., GAUNT, R., & SCHWEIZER, M. (1943). **Effects of Adrenal Cortical Compounds on Lactation.**—*Endocrinology.* **33.** 325–332. **2255**

When young g. pigs are given daily injections of 100 I.U. oestrogen for 25–30 days, the mammary glands develop, and when the oestrogen is discontinued, lactation occurs spontaneously; if, however, hypophysectomy is performed when the oestrogen is withdrawn, lactation does not occur. Experiments with 68 guinea pigs showed that when the hypophysectomized animals were given high doses of lactogenic hormone, lactation did not occur unless adrenal cortex extract or adrenotropic hormone was given with the lactogen. Lactation also occurred when 17-hydroxy-11-dehydrocorticosterone (compound E of Kendall) was injected with the lactogen, but did not occur when desoxycorticosterone acetate was used. Further experiments with 43 intact g. pigs prepared for lactation with oestrogen showed that desoxycorticosterone acetate had a lactation-inhibiting influence in the g. pig, and evidence obtained indicated that it acted partly by suppressing the production or release of lactogen from the pituitary and partly by direct action on the mammary glands. Steroid hormones which promote mammary growth in general inhibit lactation; it was shown that daily injections of 2 mg. desoxycorticosterone acetate into eight young g. pigs produced mammary development, and on cessation of the treatment all the animals lactated fairly well. The authors discuss the results in conjunction with earlier experiments.—ALFRED T. COWIE.

BECK, A. B. (1941). **Studies on the Blood Copper of Sheep and of Cows.**—*Aust. J. exp. Biol. med. Sci.* **19.** 249–254. **2256**

The copper content of the blood of normal Western Australian sheep was found to vary between 0·4 and 1·6 mg. Cu per litre, though most values were between 0·6 and 1·2 mg. Haemoglobin values for the same sheep varied between 9·3 and 17·4 g. per 100 ml. Blood Cu of normal cows varied between 0·7 and 1·7 mg. Cu per litre. and Hb between 8·6 and 16·8 g. per 100 ml. Pregnancy had no significant effect on the blood Cu level. In copper-deficient sheep and cows there appeared to be no absolute correlation between low blood Cu levels and the development of anaemia.
—C. R. AUSTIN.

I. Holman, H. H. (1944). **Studies on the Haematology of Sheep. I.—The Blood-Picture of Healthy Sheep.**—*J. comp. Path.* **54.** 26–40. 2257

II. Stewart, J., & Holman, H. H. (1944). **The Blood Picture of "Pining" Conditions in Sheep.**—*Ibid.* 41–48. 2258

I. H. examined blood samples from 171 sheep to ascertain the normal haemogram of these animals. It was found that the red cell count was 11·5 million per cu.mm. and the mean figure for haemoglobin was 12·4 as estimated by a Zeiss-Ikon haemometer. The mean corpuscular volume averaged 27·4 cu.μ, with a mean figure of 41·2% for the corpuscular haemoglobin concentration. The mean figure for leucocytes was 9,200 per cu.mm. The average figure for polymorphonuclear leucocytes was 24% and for lymphocytes it was 67·3%.

In H.'s opinion, the estimation of sedimentation rate, platelet counts, and Price-Jones curves is of little practical value in the sheep.

Possible variations due to age, breed, sex, season, and exercise were considered.

The blood picture described corresponds closely to that obtained by Fraser [*V. B.* 1. 306.] and the haemoglobin values were of the same order as those laid down by Allcroft [*V. B.* 12. 170].

II. The authors investigated the blood picture in three types of sheep "pining", *viz*, that caused by worm infestation, by cobalt deficiency, and the so-called "Solway pine". The aetiology of the last condition has not yet been determined, but the soil in this region is deficient in certain minerals, especially magnesium and potassium, and in some areas the cobalt content is also low. In seven out of 17 sheep severely infested with worms there was a definite anaemia with neutrophilia. In the cobalt deficiency condition, no evidence of anaemia or of interference with haemoglobin formation could be demonstrated. No significant abnormality of the blood constituents studied was detected in sheep affected with "Solway pine". The conclusion is made that blood examinations are unlikely to differentiate between these three conditions, and the data obtained support the view that cobalt is not directly concerned in haemoglobin formation.—D. L. Hughes.

*Chary, R. (1942). Variations physiologiques saisonnières; recherches expérimentales sur le sang de chien. [**Seasonal Physiological Variations: Experimental Investigations on the Blood of the Dog**].—*Thesis, Alfort.* [Abst. from abst. in *Rec. Méd. vét.* **119.** 63]. 2259

C. surveys present knowledge of the influence of the seasons on the frequency and evolution of human and animal illness, on sexual activity, and on nutrition. He recalls the work of Maignon on the variation of glycogenesis, respiratory combustion, and sensitivity of organisms to poisons, in spring and autumn, and gives an account of the possible causes of these seasonal variations.

He studied variations in chemical elements and constituents of the blood; details of the results of a series of experiments on the dog show that numerical variations in leucocytes occur, as well as in the leucocytic formula, and that there are variations in the number of the red corpuscles. C. concludes that in the summer there is an increase in the number of erythrocytes, and that a less marked and less regular leucocytosis occurs in the spring.—O. Hands.

Sergent, E., & Poncet, A. (1942). Etude morphologique du sang des dromadaires sahariens. [**The Blood Picture of Dromedaries from the Sahara**].—*Arch. Inst. Pasteur Algér.* **20.** 204–208. 2260

A study of the blood constituents of healthy dromedaries from different parts of the Sahara is described. The chief characteristics of the blood are the well known elliptical form of the red corpuscles (long axis averages 7·55 μ and short axis 4·15 μ), and the elongated (elliptical or oval) form of the eosinophile leucocytes. Details of diameters of the red corpuscles in camels, llamas, and related animals are given.

The percentages of the principal types of leucocytes found in the dromedary were lymphocytes 41·8, neutrophiles 54·5, and eosinophiles 3·7.—O. Cruse.

Osgood, E. E., & Seaman, A. J. (1944). **The Cellular Composition of Normal Bone Marrow as Obtained by Sternal Puncture.**—*Physiol. Rev.* **24.** 46–69. 2261

This article is a review of the literature on the subject and does not lend itself to abstraction. It deals with the technique of sternal puncture and the enumeration of the different marrow cells. An attempt is made to arrive at normal values for the marrow cell picture by a study of other authors' findings. Owing to wide differences in technique only tentative recommended standards are given.—D. L. Hughes.

Rossi, A., & Aragona, C. (1942). Cristallizzazione e solubilità di mioglobine di specie diverse. [**Crystallization and Solubility of Myoglobins of Various Animal Species**].—*Boll. Soc. ital. Biol. sper.* **17.** 206–208. 2262

The authors detail the method for preparing myoglobin crystals from heart muscle. They found that myoglobin crystals from the heart and from the skeletal muscles of the horse crystallize in the same way, that is, as bundles of fibres gathered in the middle to resemble a sheaf, or fanwise. Myoglobin from the heart of calves and cows crystallizes as triangular or pentagonal plates, the latter predominating in the older animals.

Myoglobin in 91% saturated ammonium sulphate, at a pH of 6·7–6·8, dissolves at a rate varying with the species in the following order:—dog, horse, calf, cow, sheep, g. pig, rat.—I. W. Brocklehurst.

Popoff, N. W. (1943). **Mechanism of Release of Colloid and the Significance of the Specific Crystalline Substance Demonstrated in the Thyroid Gland Histologically.**—*Arch. Path.* **36.** 587–601. 2263

The material used for this study comprised 62 human thyroids, removed surgically and illustrating various types of goitre, and the thyroid glands of 50 rabbits and 18 g. pigs. A variety of special methods of fixation and staining were used in order to identify old and recent colloid, intercellular canaliculi, intra-epithelial secretion granules and lipoid material, argyrophile recticulum, argentaffin cells, intracellular and intra-acinar crystals, crystalline thyroxin, mast cells, and "free" iron. Almost the whole of the paper deals with the human material.

Vacuolation of colloid is considered to be due to changes occurring after removal of the gland and vacuoles are rare in freshly fixed material. Crystals, considered to represent crystalline proteolytic enzymes, were demonstrated within the vacuoles and probably indicate that vacuolation is due to enzymatic liquefaction of colloid occurring after removal of the tissue from the body. In contrast to this peripheral vacuolation, the presence of central vacuoles in the acinar colloid is probably due to removal of the central inspissated colloid by the epithelial cells. Central vacuoles are not related to surgical injury or to delay in fixation. Evidence is presented in support of the view that absorption of inspissated colloid takes place after enzymatic hydrolysis. Crystals which were demonstrated in the acinar

colloid are considered to represent thyroxin in its keto form. In contrast to the enzymatic absorption of old inspissated colloid, P. considers the normal absorption of colloid to occur by intercellular canaliculi which can be demonstrated between the acinar epithelial cells by silver impregnation methods. Apical secretion granules, indicative of colloid secretion, are absent in follicles in which the intercellular canaliculi are numerous and prominent, *i.e.* secretion and absorption do not take place at the same time.

In the material from rabbits and g. pigs there were very few intercellular canaliculi and little vacuolation of colloid. Crystals of proteolytic enzyme and thyroxin were demonstrated.

There are a number of drawings illustrating these very interesting observations.—E. G. White.

Dempsey, E. W., & Astwood, E. B. (1943). **Determination of the Rate of Thyroid Hormone Secretion at Various Environmental Temperatures.**—*Endocrinology.* **32.** 509–518. **2264**

Investigation of the normal rate of secretion of thyroid hormone and the effect upon it of various environmental temperatures, was carried out on rats. Thyroid hormone formation was prevented by the administration of thiouracil, one of the antithyroid drugs, and simultaneously thyroxin in measured quantities was given for an adequate period at the end of which the thyroid was removed and weighed. By plotting the weight of the gland against the quantity of thyroxin administered, the thyroxin requirement for maintenance of the gland at a normal weight can be determined. This procedure was used as the basis of an assay method for thyroid hormone.

The daily requirement of thyroxin necessary to inhibit thyroid enlargement in thiouracil-treated animals was determined for three different environmental temperatures, *viz*, 1°C., 25°C. (room temperature), and 35°C. The rate of thyroid enlargement was greatest and began earliest in the animals maintained in the cold, was lowest in the group at the high temperature and intermediate in the group at room temperature. The quantity of thyroid hormone required to maintain a thyroid of normal weight was equivalent to 5·2 μg. of thyroxin daily for rats at room temperature; at 1°C. the thyroxin requirement was 9·5 μg. and at 35°C. it was decreased to 1·7 μg.—R. Allcroft.

Bacsich, P., & Wyburn, G. M. (1944). **Observations on the Oestrogenic Potency of Stilboestrol in the Guinea-Pig.**—*J. Endocrinol.* **3.** 401–405. **2265**

In previous studies, the authors showed that during oestrus in the g. pig, a relative hyperaemia at the antimesometrial border of the uterus is included in the uterine changes, and that a similar response is induced in ovariectomized animals with oestradiol monobenzoate. In the present study, the vascular changes were utilized as a method of biological assay of stilboestrol dipropionate and the results are compared with those obtained previously with oestradiol monobenzoate. Twenty-five adult ovariectomized g. pigs were used in the experiment. The minimum dose of stilboestrol dipropionate necessary to ensure vaginal opening in 100% of cases was 0·0025 mg. daily for six days; this was five times the amount of oestradiol monobenzoate required. A total of over 5 mg. stilboestrol dipropionate was required to produce a moderate degree of antimesometrial hyperaemia where 1 mg. of oestradiol monobenzoate had produced a comparable reaction. If, however, the assay is based on vaginal cornification or non-vascular endometrial changes, the ratio of oestrogenic activity is 1 : 1 for the two substances.—Alfred T. Cowie.

Rowlands, I. W. (1944). **The Production of Ovulation in the Immature Rat.**—*J. Endocrinol.* **3.** 384–391. **2266**

In a comprehensive study involving some 900 rats, R. determined the optimal conditions for follicular growth and for the induction of ovulation in intact immature rats by means of pregnant mare serum gonadotropin and chorionic gonadotropin. Mare-serum gonadotropin in doses of 2–60 I.U. was effective in producing follicular maturation, but had only a limited capacity to produce ovulation, but when serum gonadotropin was injected in doses ranging from 0·25–60·0 I.U. and was followed 56 hours later by 20 I.U. chorionic gonadotropin, ovulation occurred in 100% of the rats which had received 1·5 I.U. serum; superovulation (26 ova) occurred when the dose of serum reached 30 I.U.; the higher dosages caused over-stimulation of the follicles which subsequently prevented the discharge of the ova. Further experiments showed that the number of ova discharged was determined by the amount of serum gonadotropin injected, but the factor necessary for the production of ovulation was contained in the chorionic gonadotropin.

By varying the interval between the injection of constant amounts of mare serum (10 I.U.) and chorionic gonadotropin (20 I.U.) and killing the rats 18 hours after the last injection, it was observed that some rats ovulated at the eighth hour, but the optimum interval was 48–72 hours, the best results being at the 56th hour; after 72 hours the capacity of the stimulated follicles to ovulate to the subsequent injection of chorionic gonadotropin was greatly diminished. Ova appeared in the Fallopian tubes 14–16 hours after the injection of chorionic gonadotropin.

The results of this experiment are compared with those obtained from similar experiments on hypophysectomized rats.—Alfred T. Cowie.

Chaudhuri, S. K. (1942). **A Resumé of Present Knowledge of the Effect of Endocrines on the Animal Reproductive Organs and their Therapeutic Value.**—*Indian vet. J.* **18.** 229–257. **2267**

A summary of the various processes of reproductive physiology and of the endocrine control of male and female reproductive organs. The therapeutic value of hormones for treating deranged physiological functions of reproductive organs is discussed. Various methods of biological testing in pregnancy diagnosis are also dealt with.—P. Bhattacharya.

I. Worley, L. G. (1943). **The Structure and Function of the Golgi System in the Living Cells of Developing Molluscs.**—*Proc. nat. Acad. Sci.* **29.** 225–228. **2268**

II. Worley, L. G. (1943). **The Relation Between the Golgi Apparatus and "Droplets" in the Cell Stainable Vitally with Methylene Blue.**—*Ibid.* 228–231. **2269**

I. The Golgi apparatus can be revealed in many living cells by vital staining with methylene blue. The behaviour of the Golgi bodies was studied in developing mollusc embryos. The bodies were observed to increase in size by absorption of lipoid material and then later to become pyknotic and split into several droplets, representing the stage of multiplication. There is evidence that in the mollusc the Golgi apparatus is intimately concerned with fat and protein metabolism within the cell.

II. By means of supravital or intravital staining with methylene blue, W. demonstrated the Golgi apparatus in many tissues in both invertebrates and vertebrates. When the fresh tissues are treated with hypertonic salt solution, thus simulating the shrinkage

which usually occurs during osmic acid fixation, the "dye droplets" rupture and form chromophilic bodies similar to the classical Golgi bodies seen in cells treated with osmic acid. If the shrunken material is allowed to dry, the resemblance to the typical Golgi bodies becomes even more marked. Opinions of histologists as to the nature of "dye droplets" have hitherto been divided and of recent years have tended to swing towards the view that they are "neoformations" having no counterpart in the living cell.—E. G. WHITE.

SILBERBERG, M., & SILBERBERG, R. (1944). **Effects of Potassium Iodide on the Skeletal Tissues of Growing Mice.**—*Amer. J. Path.* **20.** 329–339. 2270

Mice of the slowly aging strain C57 and of the rapidly aging strain C3H were given daily injections of 0·1 ml. of 2·5% potassium iodide. The treatment caused a temporary reduction in the rate of growth and a temporarily increased proliferation of epiphyseal and articular cartilages. Formation and subsequent resorption of bone were stimulated. The mice of C57 strain were more responsive than those of the C3H strain to the treatment.—E. BOYLAND.

See also absts. **2342** (chemistry of life), **2223** (physiological relations of vitamins and amino acids), **2195** (serum protein formation), **2227** (spinal fluid pressure in calves), **2216** (diet and fertility in farm animals), **2201** (sperms of domestic animals), **2186, 2194** (hormones).

POISONS AND POISONING

JENRETTE, W. V., & FAIRHALL, L. T. (1943). **Effect of Lead Absorption on Blood Calcium.**—*Publ. Hlth Rep., Wash.* **58.** 1001–1006. 2271

The average serum Ca value for rats given 200 mg. lead chloride per animal per day for a period of four months was 9·9 mg. per 100 ml. and was identical with that of a control group. No significant difference was observed in the serum Ca values of three groups of rats maintained for one year on a diet varying in Ca content, but arranged so that each animal ingested approximately 12 mg. lead carbonate per day.

From these results it is concluded that lead absorption does not appreciably affect the blood Ca level. —R. ALLCROFT.

HYSLOP, F., PALMES, E. D., ALFORD, W. C., MONACO, A. R., & FAIRHALL, L. T. (1943). **The Toxicology of Beryllium.**—*Nat. Inst. Hlth Bull.* No. 181. pp. vii + 56. 2272

This investigation has shown that beryllium is not toxic to animals no matter how it is administered. Exposure of both rats and g. pigs to the fumes arising from the electrolysis of molten fluoride containing beryllium fluoride proved toxic, but the poisoning was due rather to the fluoride than to the beryllium. On investigating the distribution of the metal after exposure to large amounts by any of the routes tested, it was found that very little is stored. More beryllium is stored in the liver than in the kidneys, but the greatest amount is found in the skeleton.

From these results, it is suggested that, as no particular toxicity was established for beryllium, any particular toxic effect due to beryllium salts is due to the acid radical rather than to the metal itself.—G. D. S.

FITZHUGH, O. G., NELSON, A. A., & BLISS, C. I. (1944). **The Chronic Oral Toxicity of Selenium.**—*J. Pharmacol.* **80.** 289–299. 2273

Rats were fed grain diets containing dosages of selenium of 3, 5, 7, and 10 p.p.m. present in selenium-bearing maize and wheat and doses of 10, 20, and 40 p.p.m. present as inorganic selenide, over periods approximate to the lifetime of the rat. Toxic effects were observed at all levels of Se and could be divided into a subacute effect occurring within eight weeks and a chronic effect which might be survived a year or more. 10 p.p.m. Se given as the selenide was found to be about half as toxic as the same concentration from wheat and maize which killed most of the animals within the first eight weeks. Lower concentrations of Se produced chronic symptoms which included a decreased growth rate, a restriction of food consumption, and slight to severe pathological lesions. The chief lesion was cirrhosis of the liver which was observed in over 70% of the rats surviving more than three months. Among 53 cirrhotic rats surviving 18 months or longer, hepatic cell tumours developed in 11 and marked adenomatoid hyperplasia in four others. Rats dying during the first three months showed a subacute type of liver damage. Female rats were found to be more susceptible to Se than male rats and rats from different litters on the same dosage of Se showed a significant difference in growth rates. All results were examined statistically.—R. ALLCROFT.

WANNTORP, H. (1943). Om förgiftningsfaran för husdjur av arsenikimpregnerat trävirke. [**Danger of Poisoning of Animals by Wooden Objects Impregnated with Arsenic**].—*Skand. VetTidskr.* **33.** 385–427. [In Swedish : English summary]. 2274

A report of an investigation into deaths of cattle which were found to be due to arsenic poisoning as a result of the animals licking posts preserved with a liquid containing arsenic. There were 36 deaths, of which 15 are described in some detail. Arsenic was detected in liver tissue : it varied between 5 and 28 mg. per kg. of liver tissue.

The literature on arsenic poisoning in man and animals is reviewed at length, and the technique of tissue analysis for arsenic is discussed in detail.

A study was made of the potential danger to animals of preservative fluid exuding from treated telegraph poles and washed off by water (rain). It was found that poles treated simply or by the vacuum-pressure method with either of two chemical mixtures ("Boliden salt" and Basilit UA") readily yielded arsenic in dangerous amount when the wood surface was washed and brushed with water—3–4 g. As_2O_3 in two litres of water used to wash poles impregnated with "Boliden salt" and half that amount from poles impregnated with "Basilit UA".—J. E.

STEWART, J., & MCCALLUM, J. W. (1944). **The Anhydraemia of Oxalate Poisoning in Horses.**—*Vet. Rec.* **56.** 77–78. 2275

It has been observed that the material from the stomach and intestines of horses dead of "grass sickness" contains oxalate crystals and an experiment was conducted to determine whether the feeding of oxalate to horses would produce a condition similar to that disease. Massive doses of oxalate did cause an anhydraemia similar to that found in "grass sickness" but with some differences in the blood picture. In the light of these differences, the essential pathology of "grass sickness" and oxalate poisoning is distinct.—G. D. S.

BRAUDE, R. (1943). **Toxic Effects in the Feeding of Cocoa Meal to Pigs.**—*Vet. J.* **99.** 302–307. 2276

The effects of feeding cocoa meal containing 2·5% theobromine were investigated in an experiment in which 44 pigs were used in three group-feeding trials. At a level of 7½% of the ration, the cocoa meal was definitely toxic and several of the pigs in this group

died. At a 5% level the material was not noticeably toxic, but there appears to be no advantage in including it in the diet of fattening pigs as its nutritive value appears to be very small, or at any rate to be counterbalanced by non-apparent toxic effects of the theobromine.—G. D. S.

ELDER, H. M. (1943). **Stinkwort Dangers. Mortality in Sheep Flocks.**—*J. Dep. Agric. Vict.* **41.** 173–174. **2277**

The small hairs, "pappae", of the flower of the stinkwort (*Inula graveolens*) become embedded in the mucosa of the abomasum and small intestine of sheep. Irritation may be sufficient to set up an enteritis and death may occur. It is also thought that damage to the mucosa may permit the absorption of *Clostridium welchii* toxin and thereby result in enterotoxaemia. When enteritis is severe, affected animals are "tucked up" and diarrhoea occurs, with death in a few days. Often sheep die without showing symptoms, but they may be found in a comatose state. Bloating is often seen. Convulsive symptoms are usually seen in lambs.

New Holland daisy (*Vittadinia triloba*) has produced similar ill-effects.—H. McL. GORDON.

FEATHERLY, H. I., HARNDEN, E. E., DERMER, O. C., & SMITH, H. C. (1943). **Glottidium vesicarium, a Poisonous Plant in the South-west.**—*Vet. Med.* **38.** 478–479. **2278**

Ingestion by a cow of approximately 4 lb. of the beans of *G. vesicarium* caused loss of weight, staggering, prostration, and finally death after 13 days. P.M. examination showed acute inflammation of the mucous membrane of the abomasum and small intestine and engorged blood vessels. It was found that the toxicity of this batch of the beans appeared to be less after keeping for 2–3 months in the laboratory. From the results observed after feeding the beans to poultry and rabbits, it is suggested that the poisonous principle is probably an alkaloid, which may account for its reduction in toxicity on storing.

[The evidence does not appear to warrant the assumption that an alkaloid is present in the plant.] —G. D. S.

SAMPSON, A. W., & MALMSTEN, H. E. (1942). **Stock-Poisoning Plants of California.**—*Bull. Calif. agric. Exp. Sta.* No. 593. pp. 90. **2279**

This is a revised edition of a bulletin first published in 1935. A concise account, complete with references, is given of the appearance, distribution, and toxicity of each plant or group of plants, and a few species are illustrated on three coloured plates. The plants are divided into those of primary and of secondary importance. The former group (presented in probable order of importance) includes the larkspurs (*Delphinium* spp.), Western monkshood (*Aconitum columbianum*), St. Johns wort (*Hypericum perforatum*), death camas (*Zygadenus* spp.), various lupins (*Lupinus* spp.), water hemlocks (*Cicuta douglasii* and *C. bolanderi*), poison hemlock or spotted parsley (*Conium maculatum*), loco weeds (*Astragalus* spp.), milkweeds (*Asclepias* spp.), various heaths (Ericaceae), wild tobaccos (*Nicotiana* spp.), and bracken fern (*Pteris aquilina* var. *lanuginosa*). The plants of lesser importance discussed are arrow-grass (*Triglochin maritima*), the sorghums (*Sorghum* spp.), false hellebores (*Veratrum* spp.), black greasewood (*Sarcobatus vermiculatus*), mexican tea and related species of *Chenopodium*, fitweed (*Corydalis caseana*), Western chokecherry (*Prunus demissa*), thornapples (*Datura* spp.), deadly nightshade (*Solanum nigrum*), cockleburs (*Xanthium* spp.), Western sneezeweed (*Helenium hoopesii*), spring rabbitbrush (*Tetradymia glabrata*), and horsetails, certain species of fungi, and ergot. Notes are given also of a few species described as being of minor or local importance.—A. N. WORDEN.

See also absts. **2162**, **2208** (toxicity of sulphonamides), **2292** (of pentamidine), **2229** (of vitamin D active preparations).

PHARMACOLOGY, THERAPEUTICS AND DISINFECTION

DOLD, H. (1942). Der bakterienantagonistische Anteil an der keimschädigenden Wirkung des Speichels (der Mundhöhlenflüssigkeit). [**Bacteriostatic Action of Saliva**].—*Z. Hyg. InfektKr.* **124.** 579–596. **2280**

A number of antibacterial actions by saliva take place in the mouth, *viz*, (1) inhibition of multiplication of bacteria by the so-called "inhibitin" of the saliva; (2) modification of certain properties of the bacteria by the so-called "mutin" of the saliva; (3) phagocytosis of organisms; (4) bactericidal and bacteriolytic effects by substances originating from leucocytes and other cells, and (5) transient antibacterial effects by substances contained in the food and drink (*e.g.* alcohol).—J. M. R.

RISLER, J. (1943). Sur la persistance du pouvoir antiseptique. [**Persistence of Antiseptic Power**].—*C. R. Acad. Sci., Paris.* **216.** 850–851. **2281**

Timber impregnated 11 years earlier with 20% of its weight of a mixture of thymol and terpineol was bactericidal to staphylococci, streptococci, *Bacterium coli*, and *Bacillus subtilis*. Wood impregnated with phenol or cresols was bactericidal 5–7 months later. It is suggested that the antiseptic action is due to the oxidizing power of the compounds.—E. BOYLAND.

UNGAR, J., & ROBINSON, F. A. (1944). **Investigation of the Antibacterial and Toxic Action of Certain Acridine Derivatives.**—*J. Pharmacol.* **80.** 217–232. **2282**

5-Amino-acridine is slower in its bactericidal action than 2 : 7-diamino-acridine or 2 : 8-diamino-10-methyl acridinium chloride hydrochloride (acriflavine). While the 2 : 7-diamino-acridine is slower than acriflavine in its action against *Bacterium coli* and *Proteus vulgaris*, it is more rapid in destroying staphylococci. The action of all these compounds is reduced by the presence of blood or serum. They have no action on bacterial toxins. Acriflavine, proflavine, and 5-amino-acridine are much more toxic systemically than is 2 : 7-diamino-acridine. Of all the acridine bactericides examined, 2 : 7-diamino-acridine interfered least with the healing of artificial wounds in rabbits. It is suggested that the very soluble 2 : 7-diamino-acridine could be used when rapid action or an oral or systemic action is required. —E. BOYLAND.

WYSS, O. (1943). **Antibacterial Action of a Pyridine Analogue of Thiamine.**—*J. Bact.* **46.** 483–484. **2283**

An antagonism analogous to that of the sulphonamides and *p*-aminobenzoic acid is reported between thiamine and pyrithiamine, the pyridine analogue of thiamine. The relative activity as shown by the inhibitor : growth factor ratio is roughly comparable to that of sulphapyridine in the *p*-aminobenzoic acid inhibition when tested under similar conditions. *Staphylococcus aureus* was used as a test organism. Injection of pyrithiamine into mice failed to produce antibacterial concentrates in the blood and the substance therefore shows little promise as a systemic chemotherapeutic agent.—R. ALLCROFT.

WAKSMAN, S. A. (1941). **Antagonistic Relations of Microörganisms.**—*Bact. Rev.* **5.** 231–291. **2284**

Over 50 years ago it was realized that pathogenic organisms passing into soil or into sewage were largely destroyed. In mixed microbiological populations, complicated relationships of association and antagonism occur. Many sporulating and non-sporulating bacteria and particularly the *Pseudomonas* species have bactericidal properties. Actinomycetes also have antagonistic actions, particularly on Gram-positive organisms. Many fungi inhibit bacterial growth and inhibitory substances such as penicillin have been separated from them. Some bacteria, *e.g.* species of *Pseudomonas*, cause fungi to be lysed and some bacteria destroy penicillin. Bacteria and fungi often play important roles in the control of plant and animal diseases in the field. The antagonistic substances produced are of different types and widely different toxicities. Some are enzymes like pyocyanase and lysozyme, others are polypeptides such as tyrocidin, while some are less complex organic substances like pyocyanin. The review is a useful summary of the work done in the field and deals particularly with the development of disease control by the utilization of antagonisms.—E. BOYLAND.

OSBORN, E. M. (1943). **On the Occurrence of Antibacterial Substances in Green Plants.**—*Brit. J. exp. Path.* **24.** 227–231. **2285**

Of 2,300 species of plants belonging to 166 families, 63 were found to contain substances which inhibit the growth of either *Staphylococcus aureus* or *Bacterium coli* or both. The most striking results were obtained with the Ranunculaceae, particularly with *Anemone apennina* and with the seeds of *Clematis recta*. In some cases the antibacterial material was present in all parts of the plant, while in other cases it was restricted to one part, *e.g.* the bark of *Magnolia acuminata*. The agents varied in stability, those of the Ranunculaceae being lost on drying the plants.—E. BOYLAND.

COOK, A. H., & LACEY, M. S. (1944). **An Antibiotic from *Aspergillus parasiticus*. [Correspondence].**—*Nature, Lond.* **153.** 460. **2286**

Examination of about 20 strains of *Aspergillus flavus, A. oryzae, A. tamarii*, and *A. parasiticus* for production of antibacterial materials, *Staphylococcus aureus* being used as test organism, showed that filtrates of *A. parasiticus* were much superior to those from the other moulds; complete inhibition was obtained with dilutions of 1 : 200–600 after 5–12 days' incubation at 24°C.

Details of the medium producing the greatest antibacterial activity are given. In both chemical and antibacterial properties the new antibiotic resembles penicillin and it is provisionally designated "parasiticin".—R. ALLCROFT.

FOSTER, J. W., WOODRUFF, H. B., & MCDANIEL, L. E. (1943). **Microbiological Aspects of Penicillin. III. Production of Penicillin in Surface Cultures of Penicillium notatum.**—*J. Bact.* **46.** 421–433. **2287**

Strains of *Penicillium notatum* differ markedly in penicillin-producing ability, and selection of the most potent strains is of primary importance for maximum penicillin production. Active strains tend to degenerate or lose their capacity to produce penicillin, especially after continued serial transfer on laboratory media. This degeneration can be prevented by storing young spores, subcultures from which produce penicillin in relatively high concentrations. Plating procedures on active cultures yield isolates with different degrees of penicillin activity. The effects of pH and various trace elements on the production of penicillin are described.

—JOHN FRANCIS.

HAWKING, F. (1944). **Recent Work on the Pharmacology of Sulphonamides.**—*Brit. med. Bull.* **2.** 64–70. **2288**

Methods used for the estimation of sulphonamides in body fluids are discussed. Recent work on the absorption and distribution of these drugs is described. This is important since treatment must aim at maintaining an adequate concentration of the drug at the site of action. Part of the sulphonamide is bound to the plasma protein, thus reducing the effective concentration. Sulphonamides can pass through the placental barrier; acetylation of the drugs in the body, chiefly in the liver, through combination with other compounds, *e.g.* glycuronic acid, also occurs. Data of the excretion of various compounds in the urine are given; they also appear, to various extents, in the faeces, milk, and other secretions. Useful tables give the concentration of various compounds in the blood following the administration of given doses, and the solubilities of a number of sulphonamides in various fluids. There are notes on two new sulphonamides, *viz*, sulphamezathine and sulphamerazine.—J. M. ROBSON.

HARTMANN, F. W. (1944). **Local Application of Sulfonamides to Experimental Staphylococcus Infections.**—*J. Bact.* **47.** 259–271. **2289**

Localized pyogenic infections were regularly produced in the skin of albino rabbits by inoculations with suspensions of four strains of *Staphylococcus aureus*. The lesions were similar whether the organisms were introduced by intradermal injection, multiple puncture, or by subcutaneous implantation of contaminated splinters of wood, and were self-limited. The influences of sulphanilamide, sodium sulphapyridine, and sodium sulphathiazole were studied (1) by suspending the organisms in solutions of the chemicals previous to injection, (2) by application of the powdered chemicals directly to the skin following inoculation by the multiple puncture method, and (3) by introducing the powdered chemicals into lesions produced by subcutaneous implantation of contaminated splinters. The chemicals did not exert any appreciable beneficial action on the infections.—J. M. ROBSON.

BEAN, C. W., MILLER, W. T., & HEISHMAN, J. O. (1943). **Chemotherapy of Streptococcal Bovine Mastitis.**—*Amer. J. vet. Res.* **4.** 344–352. **2290**

In an attempt to determine the value of chemotherapy combined with sanitary and herd management measures in controlling mastitis, treatment was undertaken of infected animals in commercial dairy herds. A report is given of the results obtained in the first year.

Six herds comprising 485 milking cows were used. Bacteriological examination revealed that 166 (34%) of the animals were infected with *Streptococcus agalactiae* in 394 quarters and 32 (7%) with *Str. uberis* in 48 quarters. One cow was shedding *Str. dysgalactiae* from one quarter and *Str. faecalis* was found in five quarters of four other cows. Unidentified streptococci were present in 39 quarters of 23 cows. *Staphylococcus aureus* infection was detected in 103 (21%) of the animals. Treatment by infusion with acriflavine, entozon, colloidal silver oxide, and tyrothricin was tested. In all, 106 (68%) of lactating quarters responded to treatment and 118 (78%) of the quarters treated during the dry period were free from infection at the next lactation. In lactating quarters, acriflavine had an efficiency of 89% in destroying streptococcal infections, colloidal silver oxide 71%, entozon 60%, and tyrothricin 51%. In dry quarters the efficiencies were 71%, 70%, 73%, and 92% respectively.

Following treatment with any of the agents employed, *Staph. aureus* appeared in about 23% of all cases.

Generally, the efficiency of the treatment with any agent was greatly influenced by the amount of induration present in the quarter. As the proportion of cases of marked fibrosis increased so the percentage of udders cured decreased.

All four agents had some local irritative effect on the udder and caused changes in the milk. Tyrothricin was the least irritant and acriflavine the most.

Concern is expressed regarding the high incidence of infection with *Staph. aureus* following treatment. No explanation is advanced, but it is stressed that the possibility of such infection becoming predominant should be considered before evaluating chemotherapeutic agents in the treatment of bovine mastitis.

[The authors do not refer to the intramammary use of the sulphonamides. KAKAVAS and co-workers in America and more recently MILKS and other reported excellent results with sulphanilamide prepared as a homogenized suspension in mineral oil, and in Great Britain water-soluble forms of sulphanilamide and other sulphonamides have received favourable comment.]—D. D. OGILVIE.

SCHALM, O. W. (1944). **Treatment of Chronic Mastitis During the Dry Period.**—*J. Amer. vet. med. Ass.* **104.** 78–83. **2291**

All quarters of 123 " dry " cows were treated with a 5% suspension of silver oxide in oil. S. details the precautions to be taken, and concludes that, notwithstanding the occasional excessive irritation and the resulting non-functional quarters (3·8%), the benefits derived from the treatment outweigh the losses that may result from an unrestricted spread of chronic mastitis in a herd.—M. L. LEVI.

MCCOMAS, G., & MARTIN, N. H. (1944). **Trypanosomiasis Treated with Pentamidine: A Fatal Case.**—*Lancet.* **246.** 338–339. **2292**

A case record is given of a Gold Coast soldier treated for *Trypanosoma gambiense* infection with pentamidine (4:4′-diamidinodiphenoxypentane). On two successive days, 0·1 g. pentamidine was given intravenously. After an interval of one day, a third injection of 0·1 g. was given. 10 min. later the patient became unconscious and passed into status epilepticus. He died 14 days later.

Autopsy findings were in accord with those of trypanosomiasis, with super-imposed hypostatic broncho-pneumonia. It is concluded that the sudden onset of status epilepticus and of coma was directly connected with administration of the drug. Two theories are advanced: either that the drug acted directly on the central nervous system, or that the symptoms were due to a phenomenon similar to the Herxheimer reaction [an inflammatory reaction produced in syphilitic tissues following the administration of arsphenamine, mercury, or other specific treatment]. It is suggested that the latter theory is more probably correct.—D. D. OGILVIE.

BECKMAN, H., & SMITH, J. (1944). **The Apparent Advantage of Frequently Administered Quinine in Avian Malaria Infections.**—*J. Lab. clin. Med.* **29.** 43–47. **2293**

The authors found that two-hourly dosing for four days (" continuous " dosing) with quinine gave more satisfactory results in canaries infected with a virulent strain of malarial plasmodium than the traditional method of administering the drug three times daily. The plasmodial counts were lower and, further, the break in the upward trend of the counts, and the crisis, were advanced by one day in each case. The frequent treatment retarded trophozoite development by approximately 20 times.—C. HORTON SMITH.

LEISHMAN, A. W. D. (1944). **An Outbreak of Smallpox in British Troops with a Note on the Use of Sulphathiazole in Treatment.**—*J. R. Army med. Cps.* **82.** 58–62. [Author's summary copied *verbatim*]. **2294**

During an outbreak sixty-eight British soldiers were admitted to an Indian Base Hospital (B.T.) with smallpox. Twenty-two were major cases. Ten patients died. *Staph. aureus* was consistently cultured from smallpox pustules. Xylol treatment (oral) was given an extensive trial. Results were unimpressive. Sulphapyridine did not appear to influence the disease.

Sulphathiazole was given to twelve major cases. Results suggest that this drug is more effective than the other sulphonamides and that it merits further trial.

COBBETT, N. G., & SMITH, C. E. (1943). **The Eradication of Sheep Ticks [Keds], Melophagus Ovinus, by One Dipping in Dilute Derris-Water or Cube-Water Dips.**—*J. Amer. vet. med. Ass.* **103.** 6–10. **2295**

The tests were made in Colorado on 1,068 farm sheep and in New Mexico on 8,703 range sheep, the dipping baths being of the long or trench type, varying in capacity from 175–1,200 U.S. gal. Lambs heavily infested with keds at the time of dipping were marked for future identification and these, together with many other sheep in the dipped flock, were examined at intervals after dipping. Sheep in neighbouring undipped flocks were used as controls. A dip containing 2 oz. derris or cube root (rotenone content 5%) per 100 gal. water did not produce a rapid " kill ", some keds remaining alive as long as 36 hours after treatment, but the sheep were free from ked infestation for 83–120 days following treatment. With 4 or 6 oz. of derris or cube root per 100 gal., the majority of keds were killed within 24 hours and no fresh infestation was recorded in the 225 days' period of the experiment.—J. B. CRAGG.

MORRISON, L., & MCLEOD, G. B. (1941). **Derris Suspension as a Sheep-Dipping Fluid.**—*N.Z. J. Sci. Tech.* **23.** 244A–254A. [Authors' summary copied *verbatim*]. **2296**

Small- and large-scale trials have been conducted on the dipping of sheep in Derris suspensions. Complete control of *Melophagus ovinus* (sheep ked or " tick ") can be obtained by using ½ lb. of Derris powder of not less than 4 per cent. rotenone content to 100 gallons of water. Derris dips have also been shown to control lice and fleas on sheep and cattle.

MEYER, J. R. (1942). Tratamento de cães fortemente atacados por carrapatos. [**The Treatment of Dogs Heavily Infested by Ticks**].—*Biológico, S. Paulo.* **8.** 101–104. **2297**

A mixture of alcohol with 2·5–5% of an acetone extract of *timbo* [a type of Brazilian liana, of the family Sapindaceae—according to the *U.S. Dispensatory*, these extracts are used as fish poisons] was found efficacious for the treatment of dogs infested with *Rhipicephalus sanguineus*.

GORDON, R. M., & UNSWORTH, K. (1943). **The Lethal Action of Benzyl Benzoate, Dimethylthianthrene (' Mitigal ') and Tetraethylthiuram Monosulphide (' Tetmos ') on the Scabies-Producing Mites, *Notoëdres* sp. and *Sarcoptes scabiei* var. *hominis*, When Tested *In Vitro*.**—*Ann. trop. Med. Parasit.* **37.** 195–199. **2298**

In a series of *in vitro* tests, 5% solutions of benzyl benzoate, dimethylthianthrene (Mitigal), or tetraethylthiuram monosulphide (Tetmos) all proved lethal to *Notoëdres* and to *Sarcoptes scabiei* var. *hominis*. Tetmos destroyed both species of mites much more rapidly than benzyl benzoate, while Mitigal was superior to benzyl benzoate, but inferior to Tetmos in killing *Notoëdres*.—W. MOORE.

ELAM, C. W. (1944). **Follicular Mange. A Therapeutic Agent which Warrants a Trial.**—*Vet. J.* **100.** 17. 2299

E. treated two cases of *Demodex folliculorum* infestation in dogs by administering 1 oz. doses of saccus alii [? succus allii] orally three times daily. After three weeks the animals showed a marked improvement, and at the end of three months all trace of the disease had disappeared. A number of other cases were given similar treatment with the same encouraging results.
—W. MOORE.

VELU, H., & TRAIN, G. L. (1943). La phénothiazine, anthelmintique de choix pour le cheval. [**The Anthelmintic Action of Phenothiazine on Horses**].—*Bull. Acad. vét. Fr.* **16.** 213–217. 2300

A short review is given of the use of phenothiazine as an anthelmintic for horses, and of various toxic actions ascribed to it. The authors state that most of the cases of reported toxicity are not substantiated, as other causes of the conditions ascribed to the toxicity of phenothiazine were not eliminated.

The authors used phenothiazine on 50 horses in poor condition in which strongylosis was suspected, and did not notice any symptoms of toxicity, but did notice a marked improvement in condition. They give the details of six cases typical of the group, ranging in age from three to nine years, and in an emaciated condition in spite of regular care and treatment. Faecal examination showed 1–20 eggs per gramme, indicating only slight strongyle infestation. In addition two of them showed infestation with ascarids. Phenothiazine was administered in the food at daily doses of 4–30 g. for four days. The animals were weighed and faecal samples were examined over a period of 30 days. Constipation was frequently noted, and it persisted throughout the period of treatment but was not proportional to the dose administered. Elimination of parasites began at 24 hours after dosing, reached its peak 48–72 hours after the absorption of the first dose, and ceased after four days. The authors conclude that phenothiazine is not toxic to horses in the doses given, that it is the anthelmintic of choice for intestinal strongylosis of the horse, and also that it has some action against *Parascaris* and *Oxyuris*.—T. E. GIBSON.

ROSA, W. A., & GALOFRE, E. J. (1943). Eficacia de la fenotiacina en las diversas parasitosis del equino. Precauciones en su administración. [**Efficacy of Phenothiazine for the Treatment of Horse Parasites, with Notes on its Usage**].—*Inst. Parasit., Fac. Agron. Vet., Univ. B. Aires.* **2.** No. 5. pp. 74. 2301

This is an account of present knowledge of the subject, with reports on cases treated.—MILLER WATSON.

—. (1943). **Co-ordinated Trials with Phenothiazine against Nematodes in Lambs. A Report prepared at the instance of the Agricultural Research Council of the United Kingdom.**—*Joint Publ. Imp. agric. Bureaux.* No. 4. pp. 56. [4to] [3s. 6d.] 2302

The purpose of the trials is explained in the preface to the report: "In view of certain discrepancies in the published reports on the use of phenothiazine as an anthelmintic, and the fact that different criteria have been employed by different workers in assessing its efficacy, the Agricultural Research Council decided to institute a series of co-ordinated trials at several centres, so planned as to give results that would be susceptible of adequate statistical analysis, and would afford answers to certain specific questions." The trials were conducted at the Institute of Animal Pathology, Cambridge, the Department of Zoology, University of Edinburgh with the Animal Diseases Research Institute, Moredun, the Institute of Agricultural Parasitology, St. Albans, and the Veterinary Laboratory (Ministry of Agriculture and Fisheries), Weybridge. The planning of the trials and the statistical analysis of the results were supervised by Professor R. A. FISHER. Section 1 of the report comprises a review of some of the published results of other workers on the use of phenothiazine, particularly in sheep. In section 2, the general plan of the series of trials is discussed and the agreed details of techniques are outlined. Section 3 consists of notes on the findings at each of the individual centres of experiment, the actual data, weights, and egg and worm counts being given in appendixes. The general outcome of the trials, as assessed from the analysis of results, is discussed in section 4, the technical details of the various methods of statistical analysis used being set forth in appendixes.

During the trials the drug was used in tablet form and as a drench against nematodes in 280 lambs, which were separated into ten unit flocks of 28 animals, and its effects were measured by faecal egg counts, worm counts, and lamb weights. Omitting reserves, there were seven groups of four lambs in each unit flock. Each of the four lambs in a group received 0 (controls), 5, 10, 20, 30, 40, or 50 g. of the drug and, excepting the controls, two lambs received the drug as compressed tablets and the remaining two as a powder made into a drench with water. Each tablet contained 5 g. phenothiazine, 0·08 g. sodium cetyl sulphate as a wetting and dispersing agent, and a small quantity of starch as a binding agent. The drench also contained sodium cetyl sulphate in the same ratio to the phenothiazine as in the tablets. During the trials, four flocks were housed inside for six weeks to avoid re-infestation and then killed to obtain worm counts. The remaining six flocks were kept outside for 16 weeks under natural conditions and weighed at three-weekly intervals. Analysis of the data obtained from the "inside" flocks shows that at the lowest dose, *viz.*, 5 g., the greatest relative reduction in egg count was achieved, the marked susceptibility of the prolific *Haemonchus* to such a dose being largely responsible for this effect. With most intestinal worms the response was less marked but continued up to the highest dose used, while anomalous responses were obtained from *Strongyloides*, *Trichuris*, *Nematodirus*, and *Moniezia*, the last two actually showing increased counts with higher doses. The evidence of the "outside" flocks indicated that weight increases over the 16 weeks were roughly proportional to dosage up to the highest dose used, *viz*, 50 g., the increase averaging 48 times the weight of drug administered. This general impression, that the higher the dose the better the result, indicated that, judging from worm counts from "inside" sheep, the result must be ascribed to the reduction not merely of stomach worms but also of certain intestinal worms usually considered of little clinical importance, and suggests that nematodes other than *Haemonchus* are also involved in preventing normal growth. Both heavily and lightly infested lambs appeared to respond equally well to phenothiazine medication and there was no evidence of any difference in efficacy between tablets and drenches, containing the same weight of drug, beyond a suggestion from the worm counts that drenches may be slightly more efficacious against unmixed stomach worm infestations.
—J. N. OLDHAM.

SMITH, R. M. (1943). **Vermifuge Treatments and Egg Production.**—*Bull. Ark. agric. Exp. Sta.* No. 431. pp. 26. 2303

Nicotine sulphate, kamala, and combinations of these drugs were used as anthelmintics for fowls, treated groups being compared with control groups on the basis of egg production, egg weight, food require-

ments, and mortality. Twenty-four direct comparisons were made involving 1,038 birds, 717 of which were pullets and 321 hens. The experiment consisted of six separate trials over the space of eight years. All birds were apparently in good condition at the commencement of each trial, but were considered, as the result of P.M. examination of representative birds, to be infested with *Ascaridia lineata* and one or more of the known species of tapeworms. Details and quantities of the vermifuges used are given and the results of the experiment are set out in a series of tables and graphs.

Egg production was slightly but consistently higher in the group treated with nicotine sulphate than in the control groups, and treatment did not interfere with egg production. On the other hand, with kamala there was no increase in the egg production of the treated groups, but it caused a significant decrease for the 10-day period following treatment. Approximately the same decrease was noticed with the nicotine-kamala combinations. No consistent relationship was observed between the average weight of eggs and the different vermifuge treatments, except that with kamala alone, egg weight decreased for the 10-day period following treatment. Food requirements per dozen eggs produced, and pounds of food consumed per bird were practically the same for both treated and untreated groups. The percentage mortality was apparently not related to treatment.

As a result of these trials, it was considered that the administration of anthelmintics to apparently healthy birds is of questionable value.—J. D. Blaxland.

Spindler, L. A., Zimmerman, H. E., Jr., & Hill, C. H. (1944). **Preliminary Observations of the Control of Worm Parasites in Swine by the Use of Skim Milk.**—*Proc. helminth. Soc. Wash.* **11.** 9–12. **2304**

Twenty-six pigs of mixed breeds and varying in age from four months to one year, which were carrying natural infestations of *Ascaris lumbricoides, Oesophagostomum* spp., and/or *Trichuris suis* were placed on a diet of skim milk, all solid feed and water being withheld. Pigs which drank the milk readily were kept on the diet for three days whilst those which did not take the milk so readily were kept on the diet for 4–5 days. A copious diarrhoea was produced usually within a few hours of commencement of milk feeding. Faecal examinations were made on all the faeces passed by 14 of the pigs and P.M. examinations were made at the end of the feeding period. It was found that 61·36–100% of the *Trichuris*, 90·75–100% of the *Oesophagostomum* and 0·0–94·11% of the *Ascaris* were passed by the pigs whilst on the milk diet. In pigs which drank the milk readily, most of the *Oesophagostomum* were expelled during the first and second days. During the latter part of the second day the grain contents of the caecum were expelled, and the *Trichuris* were passed during the remainder of that day and during the third day. The *Ascaris* were expelled at irregular intervals.

A second group of 12 animals, carrying infestations of *Trichuris* and *Oesophagostomum* spp. but not of *Ascaris*, was fed for three days on the skim-milk diet, and then returned to the regular grain diet; faecal examinations were made on alternate days during the next three weeks, during which the faeces of 11 of the animals contained neither *Trichuris* nor *Oesophagostomum* eggs. In the 12th animal, *Oesophagostomum* eggs were found in a sample collected two weeks after the completion of milk treatment. The animals were kept subsequently in *Oesophagostomum*-contaminated pens, and 3–6 months later all carried infestations of *Oesophagostomum*, thus demonstrating that no immunity to reinfestation existed. No ill-effects were produced by the liquid milk diet or by the resulting diarrhoea, and with one exception the pigs gained in weight. There was no impairment of appetite when the pigs were returned to the grain diet.—T. E. Gibson.

Patton, J. W. (1944). **A New Conception of Azoturia.**—*Vet. Med.* **39.** 10–12. **2305**

P. reports spectacular recovery in two ponies and one heavy farm horse with typical clinical manifestations of equine myoglobinuria, following the subcutaneous injection of large doses of vitamin B_1.—A. N. Worden.

Pincemin, Y. (1943). L'hémoglobinurie du cheval : traitement. [**Treatment of Equine Myoglobinuria**].—*Rec. Méd. vét.* 119. 101–102. **2306**

Good results are claimed for the treatment of equine myoglobinuria by large intravenous doses of nascent oxygen. The animal is immobilized and two litres or more are injected over a period of 12–15 min. Following treatment, the horse usually remains quiet, the temperature usually falls, and it is said that the muscles become relaxed and diminish in volume. The treatment is repeated daily for 4–5 days, and is said to be followed on each occasion by a marked fall in the blood-sugar level. Individual case reports are not given.—Alastair N. Worden.

Lerena, E. A. (1943). Eczema crónico seco con alopecia extendida. Tratamiento por los arsenicales. [**Arsenical Treatment of Chronic Dry Eczema with Extensive Alopecia**].—*Rev. zootéc.* **30.** No. 251. 37–39. **2307**

A record of three cases of chronic dry eczema, two in horses and one in a dog, which were cured after the administration of arsenic.—Isobel W. Brocklehurst.

Vejlstrup, C. G. (1943). Puerperal Haemoglobinuri hos Kvaeget. [**Puerperal Haemoglobinuria in Cattle**].—*Maanedsskr. Dyrlaeger.* **55.** 67–68. **2308**

The author has found sodium monomethylarsinate in a dose of 10 g. to be effective against bovine piroplasmosis, after failure with trypan red, acriflavine, acaprin, etc., and the same substance combined with chalk and oak bark (equal parts to 50 g.) with pulv. acetanilidi c. camphor (15 g.) 2–3 times daily, to be effective against puerperal non-piroplasmic haemoglobinuria.—J. E.

Gillispie, J. M. (1943). **Guaiacol in the Treatment of Pneumonia.**—*N. Amer. Vet.* **24.** 487–491. **2309**

The following preparation of guaiacol was administered intravenously in doses of 75–150 ml. :– potassium guaiacol sulphonate, 5 g., ethyl alcohol, 95%, 10 g., sodium iodide, 5 g., and sterile water, 90 g.

The treatment was used on 19 dairy cows and two horses but was always combined with one of the sulphonamide drugs. It is known that guaiacol is excreted by the lungs and G. states that it acts as a sedative expectorant as well as having antiseptic and germicidal properties. By this action it prevents the solidification of areas of lung tissue, thereby facilitating the elimination of excessive lung secretions. The dose can be repeated in 24–48 hours if necessary.—John Francis.

Herriott, H. W. (1944). **Chemo-Therapy in Acute Febrile Conditions of Animals.**—*Vet. Ext. Quart. Univ. Pa.* No. 93. pp. 3–10. **2310**

An account is given of veterinary clinical experiences with sulphathiazole and sulphathiazole sodium sesquihydrate.

In a condition in dogs clinically resembling Stuttgart disease, a single dose of 50 ml. of 5% sulphathiazole sodium intravenously with 31 grains of sulphathiazole orally on the first day, 23 grains for the next two days, and 15 grains for the following six days resulted in recovery in 80% of affected animals. All of 11 cattle showing symptoms of shipping fever and treated with

sulphathiazole, made good recoveries. An initial dose of 25 g. of sulphathiazole sodium in 500 ml. of water per 1,000 lb. body weight was given, followed by oral dosage of 1 grain of sulphathiazole per lb. body weight per day.

Four cases of shipping fever in horses were also treated successfully at the same dosage level.

[In addition to difficulties of supply, treatment of most cattle and horses in Great Britain with sulphathiazole would be invalidated at the present time by price considerations. At the above dosage levels it would cost £6–£10 to treat one animal.]—D. D. O.

GYÖRGY, P. (1944). **Experimental Hepatic Injury.**—*Amer. J. clin. Path.* **14.** 67–88. 2311

A review which deals mainly with nutritional factors. Except for historical references, most of the original papers discussed have been abstracted in this *Bulletin*. After a brief consideration of the relationship between experimental liver damage in animals and human hepatic injury, G. makes the following suggestions for treatment: (1) dosage with 2–4 g. methionine (or 2–4 g. each of cystine and choline if methionine unavailable); (2) use of a diet rich in protein and methionine; (3) limitation of fat intake, and preferential use of fat rich in unsaturated fatty acids but low in cholesterol; (4) incorporation of B vitamins in the diet, but avoidance of imbalance between members of the B complex. It is suggested that such treatment be applied not only to cases of dietary hepatic injury, but also to toxic injury resulting from chloroform or other anaesthetics, burns, or surgical shock. Transfusion with plasma enriched with methionine is suggested as a possible measure in acute cases.—A. N. WORDEN.

DOLDER, W. (1942). Sur l'administration de la vitamine E (Ephynal) dans certains étables du canton de Genève. [**The Administration of Ephynal (Vitamin E) on Certain Farms in the Canton of Geneva**].—*Ref. Vitamin E-Frage in Vet.-Med., Basel, 1942.* pp. 11–12. [In French]. 2312

Examination of the stock from three farms showed that about half the cows gave a positive agglutination test for brucella infection. Treatment with vitamin E as "Ephynal" was instituted and no fresh positive tests were found; the breeding performances of the herds were improved and in many cases the serum tests were negative in animals which had previously given positive reactions.—A. M. COPPING.

STRUB, W. (1942). Erfahrungen in der Behandlung abortuskranker Rinder mit Ephynal "Roche" vet. [**Treatment of Abortion in Cattle with Ephynal**].—*Ref. Vitamin E-Frage in Vet.-Med., Basel, 1942.* pp. 6–7. 2313

Vitamin E as "Ephynal Roche" was given to 60 cows of a herd in which brucella infection had caused a poor calving performance in the previous year. After administration of vitamin E there were 55 completed gestations compared with 43 in the previous year and there were 64 live calves compared with 24. In the cows treated with vitamin E only two cases of retained placenta occurred. Ephynal was given before conception, at the third and sixth month, and in very large doses if any sign of threatened abortion was seen.

—A. M. COPPING.

KERN, A. (1942). Ephynal "Roche" und Aconception. [**Ephynal and Sterility**].—*Ref. Vitamin E-Frage in Vet.-Med., Basel, 1942.* pp. 8–10. 2314

Sterility in cows was treated by administration of one tablet of "Ephynal Roche" vitamin E daily for 12 days before mating and for two days afterwards. Successful pregnancies were obtained in 23 of 35 cows treated. In most of the unsuccessful cases complicating conditions, including vaginal or uterine catarrh or ovarian cyst, were present. It is recommended that vitamin E should be used in treating sterility only after thorough veterinary examination of the animals.

—A. M. COPPING.

TODD, W. L. (1943). **Reducing Mortality in Mutant Foxes With Kayquinone and Cal-Cofron.**—*Amer. Fur Breed.* **16.** No. 8. 8 & 10. 2315

T. has previously reported that a vitamin K preparation, administered in conjunction with a mineral supplement, prevents a haemorrhagic syndrome commonly encountered in Norwegian platinum foxes. He now postulates, on the evidence of information received from other breeders, that the condition occurs in every type of mutant fox.—ALASTAIR N. WORDEN.

*HAGNÉRÉ. (1942). La vitamine B_1 en pathologie et en thérapeutique chez le chien. [**Vitamin B_1 in Disease of the Dog and its Use in Treatment**].—*Thesis, Alfort.* [Abst. from abst. in *Rec. Méd. vét.* **119.** 73]. 2316

The use of vitamin B_1 in the treatment of various canine nervous disturbances is reported. Myoclonic convulsions resulting from distemper or of unknown origin, neuralgia, and various paralytic conditions are among the disorders named.

The recommended dosage is 10–20 mg. by intramuscular injection, daily for 4–8 days, followed by 1–2 mg. by mouth, daily for about a week.—A. N. W.

ALBERT, A., & GLEDHILL, W. S. (1944). **Adsorption of Acridines by Gauze.**—*Lancet.* **246.** 759–760. 2317

The amount of proflavine, 2 : 7-diaminoacridine, 5-aminoacridine, acriflavine, and crystal violet adsorbed by an absorbent gauze was determined. Acriflavine (B.P.) and 5-aminoacridine are least adsorbed. The adsorption is rapidly reversed by water and particularly by serum, indicating that dressings which have become impregnated with these substances may be regarded as depots which are capable of supplying the adsorbed substances to the wounds with which they are in contact. When, however, it is desired to expose the wound to the fullest concentration of the medicament from the moment of application, the use of non-absorbent dressings is recommended.—J. M. ROBSON.

WILLIAMS, R. E. O., CLAYTON-COOPER, B., FAULKNER, H. C., & THOMAS, H. E. (1944). **Further Observations on the Use of Cetavlon (CTAB) in Surgery.**—*Lancet.* **246.** 787–788. 2318

Cetavlon, used as a cleanser in a number of wounds, did not significantly reduce the incidence of infection; there was, however, no evidence of damage either to wounds washed with it or to the hands of the surgical or nursing staff who used it repeatedly. Cetavlon has been used as a routine wound cleanser in the hospital concerned for over nine months and has proved superior, as a wound cleanser, to any of the preparations commonly used.—J. M. ROBSON.

HABS, H., & KIRSCHNER, K. H. (1942). Der Pyocyaneus-Meerschweinchenhautversuch zur Prüfung von Hautdesinfektionsmitteln. [**Testing of Skin Disinfectants on G. Pig Skin with** *Pseudomonas pyocyanea*].—*Z. Hyg. InfektKr.* **124.** 557–578. 2319

The shaved and washed abdominal skin of the g. pig contains few bacteria, and is sterile in 11% of animals. It is therefore not suitable for testing the action of disinfectants. The bacteria present are usually Gram-positive cocci and sporing bacteria. The cocci are killed by tincture of iodine but not the spores. A technique has been developed for infecting the skin with *Ps. pyocyanea* and for testing disinfectants in this

skin. *Ps. pyocyanea* can subsequently be selectively demonstrated by culturing in malachite green broth. Under these experimental conditions, the value of iodine as a skin disinfectant can be demonstrated independently of the action of alcohol. Thymol-alcohol is as effective as tincture of iodine, but tannin alcohol is not.—J. M. Robson.

See also absts. **2162**, **2208** (sulphonamides), **2230** (treatment of rickets), **2248** (vitamin C and wound healing).

HYGIENE AND PUBLIC HEALTH

—. (1944). **Dairy Farm Inspection.**—*Vet. Med.* **39.** 126–128. **2320**

This short article contains suggestions addressed primarily to U.S. army veterinary inspectors who have to deal with the problem of clean-milk production. It stresses particularly the importance of co-operation with the farmer. With the proper approach, most dairymen, it is thought, will be prepared to make necessary changes in methods or equipment, provided that the suggestions made are sound.

Of milk samples from 99 sources coming to one dairy, the great majority showed a much reduced bacterial count after veterinary advisory visits to the farms, the average count being reduced to less than one-eighth of the pre-inspection figure.

—T. M. Docker.

—. (1944). **The Fluid Milk Plant.**—*Vet. Med.* **39.** 91–105. **2321**

—. (1944). **The Creamery.**—*Ibid.* 105–111. **2322**

—. (1944). **The Milk Condensery.**—*Ibid.* 112–118. **2323**

These three articles deal with inspection of premises and plants engaged in the processing of milk and in the manufacture of milk products for the United States Army, the food inspection of which is carried out by the Army Veterinary Service.

The articles are well illustrated and are concise accounts of the methods of inspection adopted.

It is obvious that a high standard is demanded and most useful specimen reports for the three kinds of plants are given.—H. E. Bywater.

Davis, J. G., Jones, V. E., & Ward, S. J. (1944). **Rapid Electrical Methods for the Measurement of Souring and Mastitis in Milk.**—*Proc. Soc. Agric. Bact., 1943.* pp. 43–45. **2324**

The need is stressed for a rapid reliable method for detecting sour milk in churns on the creamery platform, the existing method based on smell being inadequate and of an efficiency varying with the individual examiner. The standard glass electrode in use since 1941 is unsatisfactory because of the formation of a protein/fat film on milk. Colostrum and post-colostrum (acid pH) and late lactation and mastitis (alkaline pH) milk also mitigate against the method. Of these, mastitis milk, because of its tendency to be alkaline, presents the biggest problem as it tends to up-grade the milk, whereas in the resazurin test it down-grades it. Since in mastitis milk, however, the chloride content is raised and this can be measured by a simple conductivity measurement, a correction can be applied to the pH value on the basis of the chloride content. A similar correction can be applied for the resazurin test. The authors therefore suggest that tests for sour milk should include a conductivity test in order to obtain a correction for the pH values, and correction for the rapid resazurin test.—H. I. Field.

McIntosh, J. A., Sotola, J., Boggs, M., Roberts, J., Prouty, C. C., & Ensminger, M. E. (1942). **The Relation of Ultra-Violet Light and Temperature during Aging to Quality of Beef.—Part I.**—*Bull. Wash. agric. Exp. Sta.* No. 422. pp. 26. **2325**

Storage of meat at temperatures low enough to retard putrefactive changes is expensive and results in loss due to discoloration and excessive surface drying; furthermore the meat does not ripen as quickly as it does when kept at higher temperatures.

The work described was undertaken to ascertain if the use of ultra-violet rays—by inhibiting bacterial and mould growth—would permit the ripening of beef at higher temperatures and humidities, thus reducing both the cost of storage and the loss from surface drying and discoloration. It was found to be of no practical use. After exposure to ultra-violet rays of "short loins" of beef, stored at 34°–50°F. for 7–14 days at 90% relative humidity, there was a greasy appearance of the fat and darkening of the colour of the lean meat. Shrinkage was actually increased but cooking losses were not affected by ultra-violet irradiation.

Beef aged for 7–14 days at 50°F. was slightly more tender, as was good quality beef when frozen for six months at 0°F.; the use of ultra-violet rays did not appreciably affect the meat in either case.

The fat of "short loins" of beef contains some vitamin D which was not affected by exposure to ultra-violet rays for seven days.—H. E. Bywater.

Perriello, R. C. (1944). **A Gastroenteritis Outbreak from Food.**—*J. Milk Technol.* **7.** 68–72. **2326**

Gastro-enteritis occurred in 57 workers in a factory following feeding in the canteen. No fatalities occurred. It is considered that the cause was probably raw milk; a salad was prepared in utensils also used in connexion with the milk. Staphylococci were isolated from the milk of all of seven cows supplying the canteen, from milk drinks, and from the salad in the canteen. The necessary tests to prove the pathogenicity of the staphylococcus were not carried out.—R. M. Loosmore.

See also absts. **2116** (TB. control in Denmark), **2179** (trichinosis inspection of fox flesh in Sweden).

TECHNIQUE AND APPARATUS

Albrecht, B. (1943). Zur Bakterienfiltration mit Ueberdruck. [**Bacterial Filtration with Pressure Filters**].—*Zbl. Bakt. I.* (*Orig.*). **150.** 282–285. **2327**

A. describes how the commonly used apparatus for the filtration of bacteria from fluids can be employed so that the procedure may be accelerated by the application of either a positive or negative pressure. The article is well illustrated.—N. S. Barron.

Belin, C. (1943). Digestion papaïnique des viandes cuites. Application à la préparation d'un nouveau milieu de culture. [**Papain Digestion of Cooked Meat. Application to the Preparation of a New Culture Medium**].—*Ann. Inst. Pasteur.* **69.** 305–307. **2328**

A description of the preparation of a papain digest of meat, to be used as a substitute for commercial peptone in the preparation of culture media. The method is economical, and media prepared with papain digest favour the growth of delicate organisms and the formation of bacterial toxins.—I. W. Brocklehurst.

HUGHES, G. C. (1943). **Fluorescence Microscopy for the Detection of the Tubercle Bacillus.**—*Med. J. Aust.* October 30th. 353–355. 2329

A suitable preparation is stained with the fluorescent aniline dye auramine and then treated with acid alcohol. Acid-fast organisms retain the dye and the rest of the preparation is decolorized. Subjected to ultra-violet light, the stained bacilli become fluorescent and are seen through a suitable filter to absorb the ultra-violet light as yellow rods on a dark background. Dry objectives giving magnification of only 200 to 400 × are sufficient for location and identification. This procedure permits the examination of a far greater area of the smear. Routine examination of 500 sputum smears yielded 59·8% positive by fluorescence microscopy and 47·2% by the Ziehl-Neelsen technique. The original article should be consulted for details of the apparatus used. —D. F. STEWART.

HOLM, J., & PLUM, N. (1943). Om Metoderne til Paavisning af Tuberkelbakterier i Ekspektorat fra Mennesker. En Sammenligning mellem Fluorescensmikroskopi, Mikroskopi af Ziehl-Neelsen-farvede Praeparater og Dyrkning. **[Methods of Demonstrating Tubercle Bacilli in Sputum. Comparison between Fluorescence Microscopy, the Ziehl-Neelsen Smear Method, and Culture].**—*Maanedsskr. Dyrlaeger.* **55.** 81–103. 2330

This is a report of tests carried out with 5,447 samples of human sputum in order to study the value of microscopic methods in diagnosis, using the Ziehl-Neelsen stain and fluorescence microscopic method, as compared with culture on Löwenstein's or Besredka's media. Several groups of sputa were tested comparatively and resulted in the finding that the two microscopic methods were about equally efficient and were only about half as reliable as the cultural methods. In a study of a series of sputa bearing a light infection the microscopic methods were even more unreliable, failing to detect three-quarters of the positive cases. After this observation had been made, a fresh comparative study was made on sputa classified according to origin—sputa from persons not known to be tuberculous, sputa from persons previously suspected of TB., and sputa from tuberculous sanatorium patients. The microscopic methods failed in one-half, one-third, and one-half respectively, of the cases diagnosed positive by culture.

Microscopic methods are only useful for preliminary sorting purposes. All samples negative to microscopy should be examined culturally.—J. E.

MEYER, H., & DE OLIVEIRA, M. X. (1943). Conservação de Protozoários em culturas de tecido mantidas à temperatura ambiente. **[Preservation of Protozoa in Cultures kept at Room Temperature].**—*Rev. brasil. Biol.* **3.** 341–343. 2331

The authors used tissue cultures of liver, spleen, and heart to preserve toxoplasms and *Trypanosoma cruzi* at room temperature.

After a preliminary incubation at 38°–39°C. for 24 hours, the cultures were kept at room temperature and the protozoa were kept alive in this way for periods up to 25 days. By making subcultures periodically, the authors have been able to maintain fully virulent strains for more than a year.—MILLER WATSON.

WHITLOCK, H. V. (1943). **A Method for Preventing the Development of Strongylid Eggs in Sheep Faeces during Transport and Storage.**—*J. Coun. sci. industr. Res. Aust.* **16.** 215–216. 2332

For the transport of faecal samples over long distances, involving periods of more than about 12–15 hours, tubes are prepared as follows. A ½-in. plug of absorbent cotton wool soaked in *o*-dichlorbenzene occupies the bottom of a ½ in. × 5 in. test tube; a ½ in. plug of non-absorbent cotton wool is superimposed on a 5 g. faecal sample and the tube is then corked. Such tubes can be stored for at least two months before use. When faecal samples (from sheep) have the usual pellet form they do not obstruct the circulation of vapour in the tube, but when they are soft, care must be taken lest the tube be blocked and the eggs in the upper portion escape the action of the *o*-dichlorbenzene. A passage about ¼ in. in diameter should be made through such a sample by means of a piece of wire or stick.

The vapour from formalin and formol-acetic-alcohol killed the developing embryo in strongylid eggs after some hours and interfered with the flotability of the eggs. Carbon disulphide vapour killed the embryo rapidly and impaired flotability. Crystals of *p*-dichlorbenzene had no effect on the development of eggs. —H. McL. GORDON.

EIGENFELD, D. D., & SCHLESINGER, C. J. (1944). **An Improved Flotation Method for the Recovery of Ova from Feces.**—*J. Amer. vet. med. Ass.* **104.** 26. 2333

The technique involves the use of a 6 in. × 1 in. test-tube which, after being softened with a blowpipe about 2 in. from the open end, is drawn out into a small spout-like side-arm bent downwards towards the closed end of the tube. A faecal suspension in brine, zinc acetate, or other flotation solution is placed in the tube till it reaches almost to the level of the side-arm. A funnel, whose stem reaches to the bottom of the tube, is then introduced and, after sufficient time has elapsed for amoebic cysts or helminth eggs to float to the surface of the fluid, enough flotation solution is introduced *via* the funnel to allow 2–4 ml. of the surface layer to spill over through the side-arm into a centrifuge tube. 10 ml. distilled water are then thoroughly mixed with the faecal suspension in the centrifuge tube, and after centrifugation for a few minutes the sediment is examined for cysts or eggs.—J. N. OLDHAM.

SCUDDER, S. A. (1944). **The Combined Gram-Pappenheim Stain as Modified for Films and Paraffin Sections.**—*Stain Tech.* **19.** 39–44. 2334

After discussing previous work on this technique, S. describes a new stain employing buffered crystal-violet Gram stain, alkaline iodine mordant, acetone decolorizer, and ethylated methyl green and pyronin yellowish counter-stain. Differentiation of wide range is obtained, polymorphonuclear cells, monocytes, epithelial cells, red blood cells, Gram-positive and Gram-negative bacteria, fungi, spermatozoa, and crystals, being clearly defined.—T. M. DOCKER.

MARENGO, N. P. (1944). **Paraffin Section Thickness —A Direct Method of Measurement.**—*Stain Tech.* **19.** 1–10. 2335

Paraffin sections were cut, re-embedded one on top of the other, cut again at right angles, stained, mounted, and the thickness measured microscopically by means of a filar micrometer. Relatively undistorted 3 and 5μ sections were secured when a hand-honed knife with a 23° facet bevel, set at a clearance angle of 7°, was used, and hard paraffin (56°–58°C.) with 5% beeswax and 5% bayberry wax employed for embedding. Bull testis cut at 3, 5, and 10μ settings produced sections averaging 3·31μ, 5·25μ, and 10·82μ respectively. It was shown that sections below 5μ are necessary for the accurate study of cytoplasmic inclusions.—T. M. DOCKER.

See also absts. **2110**, **2111**, **2113** (mastitis diagnosis), **2127** (cultivation of *Past. tularensis*), **2136** (of brucella from blood), **2164** (production of tetanus toxoid), **2165** (of *Cl. welchii* toxin), **2160** (of polyvalent bacteriophage), **2147** (cold preservation of plasmodia).

MISCELLANEOUS

—. (1944). **Great Britain. Second Report of the Committee on Veterinary Education in Great Britain.** —pp. 35. Cmd. 6517. London: H.M. Stat. Off. [8vo] [6d.] [Summary copied *verbatim*]. **2336**

1. The Committee were invited to review the recommendations made in their Report published in 1938 in the light of the great changes in the position and prospects of agriculture in this country since that date. The national need calls for the best possible training for the veterinarians of the future who will be required in numbers substantially greater than exist at present or have hitherto been envisaged. The Committee's present recommendations are based on the assumption that agriculture will in future be maintained in a healthy and prosperous condition.

2. Recent estimates put the annual loss to the nation in livestock and livestock products due to animal diseases at not less than £30,000,000. The bulk of this loss is believed to be ultimately preventable, but only if expenditure on veterinary training on a considerably greater scale than at present is incurred.

3. In 1938 the Committee estimated that the future annual demand for newly qualified veterinarians would be about 150 for the quinquennium 1938–1942 and 115 subsequently. This estimate proved to be too low and the Ministry of Agriculture and Fisheries now expect that there will be a demand for about 220 veterinarians annually for a period of roughly ten years with a possible reduction to 150 annually thereafter. The Committee do not consider that the estimate of 220 is excessive and have framed their recommendations on this basis, but see no reason to believe that the demand will fall after a decade to 150.

4. The Committee made careful examination of the possibilities of providing for an annual output of 220 graduates by expanding the four existing Schools at London, Edinburgh, Glasgow and Liverpool. They reached the conclusion that this would be most undesirable both for students and teachers and that, allowing for an annual output of about 30 graduates each from Glasgow and Liverpool and of 100 from London and Edinburgh together, it will be necessary to provide two new centres. These two and the Glasgow centre should be placed within Universities and the Committee recommend that new schools should be located at Cambridge and Bristol.

5. The Committee are convinced that the best possible training for veterinary surgeons can be secured only by persuading Universities to undertake responsibility for that training. Nothing short of this will give veterinary education the standing and the opportunities for development which the increased and still increasing importance of the profession to the national economy deserves and requires. Veterinary studies should be given full University status, a degree in veterinary medicine becoming a registrable qualification. There needs to be an assurance of a sufficient minimum standard of training in all the schools. At present the R.C.V.S., through examinations which its Council conducts strives to maintain such a minimum standard. The Committee recommend that the Council, altered in constitution but with enlarged duties, should continue to perform this function.

6. The Committee regard it as essential that the Royal College of Veterinary Surgeons should remain the governing body of the profession and propose by an enhancement of its functions that it should be enabled under changed conditions to carry out its work more effectively. They recommend in respect of Universities authorised to confer degrees which are registrable qualifications,

(1) that legislative provision should be made in respect of veterinary education identical mutatis mutandis with that already provided in respect of medical education, the Council of the R.C.V.S. being given corresponding powers to those of the General Medical Council.

(2) that the Council of the R.C.V.S. should be required to place upon the Register of members of the College the names of all [Veterinary] graduates of Universities authorised by the Privy Council to confer degrees which are registrable qualifications.

(3) that the Council should, in mutual agreement with a University, inspect the premises and equipment used for veterinary education and support any representations made by the University with regard to deficiencies therein or in staffing.

In respect of Veterinary Schools not being Universities the Committee recommend that the Council should be empowered :–

(1) to inspect such schools and if the instruction given therein is found insufficient, that it should have the right to require improvement of the instruction and if this is not effected to report the matter to the Privy Council.

(2) to give support, when thought desirable, to representations by the authorities of a school similar to the support given to a University under (3) above in respect of premises, equipment and staffing.

7. It is recommended that the Council of the R.C.V.S. should consist (apart from members from Eire) of 33 persons, of whom 17 shall be members of the R.C.V.S. elected as heretofore, 12 shall be members of the R.C.V.S. appointed by Universities and affiliated Schools, namely two each appointed by the Universities of Cambridge, Glasgow, Liverpool and Bristol, and one each by the University of Edinburgh, the Royal (Dick) Veterinary College, the University of London and the Royal Veterinary College and four appointed by the Crown who need not be members of the R.C.V.S.

8. It is recommended that the Council of the R.C.V.S. should enlarge its field of selection of examiners by taking power to employ teachers in the Schools and members of Council as external examiners for the Diploma.

9. Any Universities which may be given the power to confer registrable degrees are strongly urged to include practising veterinarians among their external examiners in clinical subjects and to consult the Council of the R.C.V.S. in selecting such examiners.

10. The R.C.V.S. should continue to be responsible for the conduct of the examinations (other than those for University degrees) for the diploma of membership of the College and for the conduct of the examinations for the Fellowship diploma and for the diploma in veterinary state medicine.

11. Acceptance of the Committee's recommendations would mean that membership of the R.C.V.S. would continue to be the licence to practise but membership would be open not only to those candidates who had passed all the diploma examinations conducted by the Royal College but also to those who had obtained a registrable degree at a University authorised by the Privy Council to grant such a degree. Membership of the R.C.V.S. would remain the sole means of entry to the profession.

12. The recommendation made in the Committee's previous report that a field station should be attached to each school has received widespread support. Some account is given with a rough estimate of cost of the buildings, stocking and staff proposed for a new field

station to be attached to the Liverpool School. While within limits the size of a station may vary, it should not be so large that its instructional interests would necessarily be subordinated to those of normal commercial management.

13. The importance of having an adequately equipped and staffed hospital for large animals on each field station is emphasised. While the attachment to a school of a veterinary practice may be a useful adjunct, it is not adequate to provide the basic clinical training which can only be given in a hospital where animals are under constant observation by both teachers and students.

14. In their previous report the Committee recommended that a pupilage of at least six months on a farm at varying seasons of the year should be required as a foundation of a more practical training in animal husbandry. They repeat this recommendation and also one to the effect that every student should in the course of his training spend a period of at least six months with a veterinary practitioner. At least half of this period should be taken in the fourth and fifth years of study.

15. The conduct of research is an essential function of a teaching institution, and not least of one engaged in the field of veterinary medicine. Veterinary schools should be asked in framing their estimates to make adequate and specific proposals for expenditure on research by the various departments and these should be favourably considered by the Government.

16. Bursaries should be provided specifically for veterinary students on the principle that no boy or girl whom a training centre is prepared to accept shall be precluded from training by lack of means. A bursary should be of sufficient value to enable the holder to take full part in the life of the University or College. In the award of bursaries qualities of character and personality essential to success in veterinary practice should be taken into consideration as well as intellectual ability, and no bursary should be given without an interview by the awarding or recommending body.

17. Graduate scholarships should be made available, as and when required, to enable students of outstanding ability to work for higher degrees after qualification.

18. Private endowment of veterinary education is commended.

19. While not making any definite recommendation on the subject, the Committee favour the idea of veterinary education being undertaken in a separate faculty of veterinary medicine in a University rather than becoming a function of an existing faculty.

20. The institution of a special enquiry on the subject of unqualified practice is of urgent importance.

21. The Committee estimate very roughly that the acceptance of its proposals would involve a capital expenditure of the order of two million pounds and an additional recurring expenditure of about £210,000 a year.

—. (1944). **Ministry of Agriculture and Fisheries, Agricultural Improvement Council for England and Wales. Report of the Committee on Hill Sheep Farming in England and Wales.** pp. 40. Cmd. 6498. London : H.M. Stat. Off. [8vo] [9d.] **2337**

A report is given of the present position of hill and upland sheep farming in England and Wales. Measures are suggested to improve the condition of the grazings, the health of the sheep, and the methods of husbandry

Although it has proved impossible to assess with accuracy the losses from disease, the committee is satisfied that such losses are very considerable. There is presumptive evidence that the incidence of disease is rising.

Recently, preventive inoculation methods have controlled some of the major infectious diseases and parasitic gastro-enteritis can now be successfully prevented and treated, but tick infestation and sheep blowfly remain major problems urgently requiring attention. Trace element deficiencies also require extended study. It is recommended that research into diseases of hill flocks should be greatly extended, the pure veterinary approach being closely linked with studies in pasture improvement, breeding, and management.

The difficulties of bringing the practising veterinary surgeon into contact with hill sheep disease problems are discussed. The veterinary investigation officer service is inadequate to deal with the problem. It is recommended that veterinary officers of the Ministry of Agriculture should be detailed to work in collaboration with the veterinary investigation officers to survey the disease position, to give advice, and to further the application of known methods of control of disease. This is regarded, however, merely as an interim arrangement. A more permanent solution is suggested to be a scheme for the control of hill sheep diseases on the lines of the "panel scheme" for cattle. It is recommended that the Ministry of Agriculture, the National Veterinary Medical Association, and the National Farmers' Union should be asked to consider such a scheme.

It is also recommended that the production of biological products for veterinary use should be brought under control and standardization as soon as possible and that research on dips, particularly in relation to the control of blowfly strike and tick infestation should be intensified.

Finally, it is advocated that, as soon as possible, stations should be established for the comprehensive study of hill sheep problems under co-ordinated direction, these stations being concerned primarily with the application of research findings to hill sheep farming and the provision of facilities for research workers to study hill sheep problems in a suitable environment.—D. D. OGILVIE.

—. (1943). **Parliamentary and Scientific Committee. Scientific Research and the Universities in Post War Britain.** pp. 18. London : Parliamentary and Scientific Committee. [8vo] [1s.] **2338**

The committee regards it as axiomatic that Britain cannot afford to fall behind other nations in research. In the period between the wars, Britain lost her pre-eminence in production, but since the beginning of the present war it has been demonstrated that this was not due to any diminution of native talent. It is advocated that the ability of the nation should be given ample scope in the peace ahead.

According to recent estimates, the university income of the U.S.A. is more than ten times greater than that of Great Britain and her total research expenditure of £70,000,000 a year is at least ten times as large. The expenditure of the U.S.S.R. is on a similar scale. Britain must be prepared for an expenditure of at least ten times as much annually on research as hitherto.

In veterinary science as in many other branches of biology, Britain's research organization is unworthy of her responsibilities and urgently requires expansion.

This expansion in all research fields will entail considerable increase of scientific personnel. The means whereby this may be accomplished are discussed.

—D. D. OGILVIE.

JACK, H. W. (1943). **Veterinary Services in Fiji.**—*Agric. J. Fiji.* **14.** 71–74. **2339**

The first veterinary surgeon was appointed in Fiji

in 1907. Additional veterinary officers were appointed from 1925 onwards, and the present veterinary staff now comprises one senior veterinary officer and two veterinary officers. The first stock inspector was appointed in 1930 and since then two other European stock inspectors operating as part of the veterinary division have been added. The first native was trained as a veterinary assistant in 1924. Ten others have since been trained.

The veterinary division maintains two clinics where about 800 cases are treated annually.

A census in 1941 gave the animal population of Fiji as 84,344 cattle, 16,812 horses, 365 sheep, 8,695 pigs, and 118,767 poultry.

With the exception of TB., the disease incidence in large animals is low. Most cattle diseases are of the chronic type, the most important being TB., contagious abortion, and nutritional and parasitic disorders. In horses, goats, and sheep nutritional diseases and parasitic infestations are the chief ailments. *Dirofilaria immitis* (heartworm) is very common in dogs. Poultry are affected with numerous diseases including several of the acute infections encountered in other countries.

—D. D. OGILVIE.

REPORT

McLEAN, A. (1943). **Northern Ireland. County Borough of Belfast. Report of the City Veterinarian on the Work of his Department for the Year 1942.** —*Rep. med. Offr Hlth, Belfast, 1942.* p. 12. **2340**

Of a total of 277,259 animals slaughtered in the Belfast Municipal Abattoir, 2,068 were condemned. These included 958 of 23,270 cows, 293 of 8,593 calves, and 458 of 7,095 pigs.—D. D. OGILVIE.

See also absts. **2130**, **2131** (pullorum disease eradication, Massachusetts).

BOOK REVIEWS

BRUMLEY, O. V. [D.V.M., Dean of the College of Veterinary Medicine, the Ohio State University, Columbus, Ohio]. (1943). **A Text-Book of the Diseases of the Small Domestic Animals.** pp. 422. 37 figs. London: Baillière, Tindall & Cox. [4th Edit. Revised] [8vo] [27s. 6d.] **2341**

This edition differs in detail from the previous edition by certain revisions and by one innovation—the provision of tables of equivalent weights in the metric and avoirdupois systems, doses in the text, with a few exceptions, being given in the metric system. These tables are not complete enough to obviate all incursions into mental arithmetic and lack instructions on how to convert grammes into ounces etc., which would be an additional help.

As for the general text, it is very noticeable that the materia medica is old-fashioned, many herbal extracts being recommended for diseases for which modern drugs are now available; even powdered iron is recommended for anaemia. Acridine drugs as antiseptics appear to be entirely overlooked and no individual sulphonamide is mentioned. Also, many therapeutic suggestions are so cryptic as to be useless to any veterinary surgeon seeking practical advice—"electric current" (*sic*) for nerve paralysis, etc. Infectious feline enteritis, cat distemper, and infectious panleucopenia are described as a single disease.

In general the disease descriptions are good and comprehensive, and if the therapeutic paragraphs were modernized and given greater detail, the book would be of very great service to the practitioner as well as to the student.—J. E.

BACON, J. S. D. [M.A., Ph.D.]. (1944). **The Chemistry of Life. An Easy Outline of Biochemistry.** pp. ix + 118. London: Watts & Co. [8vo]. [2s. 6d.] **2342**

The titles of this book indicate the courage of the author. The success of such books as "Mathematics for the Million" and of many of the Pelican series of scientific books indicates that there is a demand for popular books on science; the reviewer, however, has not found this book to be easy reading. The first two chapters dealing with tissue constituents and tissue reactions are those which suffer most from compression. Chapter III on the chemistry of growth and differentiation describes the action of evocators and the ductless glands. In the chapter entitled "The Biochemist Explores Life", the contributions of biochemistry to the study of heredity and evolution are discussed, and the essential similarities in biochemical behaviour of most forms of life are stressed. Later chapters on food and agriculture and on fermentation and disease relate to the more immediate human contacts and are the clearest parts of the book. The final chapter on the relation of biochemistry to the other sciences shows how chemistry, physics, and medicine are concerned with the progress of biochemistry.—E. BOYLAND.

TAYLOR, H. S., LAWRENCE, E. O., & LANGMUIR, I. (1942). **Molecular Films, The Cyclotron, and the New Biology.** pp. 95. 24 figs. New Brunswick: Rutgers University Press. [8vo]. [$1.25]. **2343**

This group of essays written to celebrate the 175th anniversary of Rutgers University illustrates how different sciences are interrelated. The first essay is an account of the history of science, since the foundation of Rutgers University; in this essay Dr. TAYLOR emphasizes the importance of interactions between pure and applied science, and between physics and chemistry on the one hand and biology on the other.

Dr. IRVING LANGMUIR'S discussion on surface phenomena is rather informal and deals with the use of the "Langmuir trough". He shows how the study of the behaviour of films on surfaces, particularly on water surfaces, has been correlated with the shape of molecules and with the biochemical behaviour of proteins.

Professor E. LAWRENCE describes how cyclotrons have been used to produce neutron rays and to induce radio-active elements, and how these have been used in biology. Neutron rays are more effective than X-rays in destroying cells which are not dividing and they have been used in the treatment of cancer. Artificially induced radio-active elements have been used in tracing the movement of iodine in the thyroid gland, in studying calcium and phosphorus metabolism, and in the organic chemistry of photosynthesis. Radio-active phosphorus has been used in the treatment of leucaemias and radio-active strontium in the treatment of bone tumours.

The book is of general scientific interest in that it describes the present position in the application of certain physical techniques to biological problems.

—E. BOYLAND.

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